

AVIATION WEEK

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50 CENTS



How to make your shots count

A lot of work has been done by a lot of people to increase aircraft stability. And now, from Honeywell, there comes a device that greatly advances the cause of the more stable flying gun platform, so important to accurate rocket and gun firing.

This device is called a Turn Coordinating Yaw Damper. It is now in production and is currently being installed in the AVRO CF-100. That's the all-Canadian fighter, pictured above, guarding the northern approaches to our continent.

The new Turn Coordinating Yaw Damper is a significant advance over earlier Yaw Dampers. With it a pilot can fly with his feet off the rudder pedals. No matter how he moves the stick, the turn—whether transient or steady—will always be coordinated. He is relieved of his concern over yaw, and has more

positive assurance that his shots will count.

On the CF-100 the Turn Coordinating Yaw Damper is made to function as the rudder axis for the Honeywell MH-11 Autopilot, with which the CF-100 is also equipped.

The important improvement in performance made possible by the Turn Coordinating Yaw Damper serves to demonstrate how *automatic control* is such an important part of aviation progress. And *automatic control* is Honeywell's business.

MINNEAPOLIS
Honeywell



Aeronautical Controls

2600 Ridgway Road, Minneapolis 13, Minn.

The **FUEL** goes



'round
and
'round
and
comes
out

CLEAR

THE HY-POWER FUEL BOOSTER PUMP BEATS THE PROBLEM
THAT "MAKES AN AIRPLANE'S BLOOD BOIL"

It is now several years since Hydro-Air tested the situation of its Engineering Staff and Research Facilities to the dangerous phenomena of vapor stall characteristics in Fuel Systems at altitude.

Preliminary consultations with leading aircraft companies led to an intensive research program. In the course of this research an entirely new principle was developed. The result of this new approach is the HY-V₂L Fuel Booster Pump. Instead of the welcome fuel vapor being vented, it is forced back into liquid form in the pump.

Proof again that there are few projects too large... no project too small... for Hydro-Aire's unequalled research facilities

"Finger-tipped action"

HYDRO-AIRE[®] Inc.

*Every Fighter,
Every Bomber, Every Transport
is High-Speed Equipped.*

Proof again that there are few projects too large...no project too small...for Hydro-Aire's unequalled research facilities.

"Finger-tipped action"

B.F.Goodrich



Sealed lips hold the secret of faster maintenance

LOCKHEED ENGINEERS were looking for a way to seal the gap between elevator and stabilizer on the R-55's "Nosego" for another approach of control. A flap seal—flap strip of coated fabric—would do the trick like an ordinary flap, seal poses a maintenance problem. Every time an elevator is raised or for service, the flap and coat must be removed and laid with only

So Lockheed engineers came to B. F. Goodrich with the problem. And B. F. Goodrich had the answer—the Pressure Sealing Zipper.

The upper overlapping adductor lips possess a 3000 ciliomat and gastric processes. As a result, the elevans can withdraw their mouth to open. When an elevan is disturbed, it withdraws its mouth and then extends its mouth by laboriously taking out the oral tentacles after another. If a new elevan is disturbed, old and new halves of the upper cilia open preferentially, since all halves of the upper are interchangeable. And the upper makes it easier to get a grip on the leaf and around the hump shows over the mouth arm to the plant.

Zippers can be cemented onto either fabric or metal. They come open and closed. Zipper simply wound complete shapes. Are used on suitcases, suitcases, interior covers, wheelchair protective coverings. For information on construction and applications of *Plastex Sealing Zipper*, write for our new booklet, "Hold Everything." The B. F. Goodrich Company, Akron, Ohio. Division Admistrative Office

B.F. Goodrich
TIRES IN BUSINESS



Illustration by
Eduard Mordz & Company
Chicago

The thousand-mile handshake

When a company owned Beechcraft Executive Transport is available for instant action, you and your key men find time to shake hands with field men, customers, new business prospects regularly. For example, you can leave at your convenience, cruise in

airline comfort one thousand miles in less than five hours, land to business, return that day. Home office work can't pile up.

Thousands of executives use this漫游 Beech "Twin" in just such liaison daily in your business.

you could use more time. Investigate! Typical cost and operating data on request. *o o o*

Call your Beechcraft distributor or write Beech Aircraft Corporation, Wichita, Kansas, U.S.A.



NEWS DIGEST

Domestic

Government-owned missile plant operated by Hughes Aircraft at Tucson, Ariz., will not be taken over by the Air Force, industry sources disclosed last week despite reports that such a move is under consideration because of HAC's recent management troubles (Aviation Week, Oct. 15, p. 15). Other defense contractors are also heavily involved in Hughes research and development laboratories at Culver City for new and improved missile designs.

Lightplane airplane model of 17,605 ft. has been built by Cessna Aircraft's research XL-198 and refined by the Federation Aeronautique Internationale, the Wichita airplane builder announced last week.

President Steckler last week named Herman International Transport to USAF Col. Bert Roberts (left), (Argentina) as chief of Project Division and Walter L. Misick (now staff chief pilot for Goettner Aircraft Corp.)

Fisher Aviation Corp. has produced basic patents on "jet cooling" and cooling in-vacuum from Prof. Chia C. Kao of the Massachusetts Institute of Technology. It is producing them at Farnoud, Calif., in cooperation with private investors.

Douglas Aircraft has delivered the first of four DC-8s ordered by Alitalia, Italian Airlines.

Eastern Air Lines' first Wright Turbo Compound-powered Super Constellation was delivered to the carrier's main line at Miami, Fla., Nov. 10, is scheduled to go into operation on New York-Miami flights this week.

Financial

United Air Lines net earnings for the first three quarters of 1955 totaled \$10,611,115, a drop of \$238,594 from the same period of 1952. Operating revenue increased 10% to \$111,843,455, but operating expenses increased 26.1% to \$111,174,556.

Fairchild Engine & Airplane Corp., Hagerstown, Md., reported net earnings of \$3,486,800 for the first nine months of this year, tipping profits for the same period of 1952 by \$1,399,850. Sales totaled \$178,940,000, compared with \$83,160,000 last year.

National Airlines net revenue for the first quarter of fiscal 1956 totaled \$279,243, compared with \$173,325 in the corresponding period last year. Operating revenue increased to \$7,312,613 from \$6,651,175.



Navy Evaluates New Trainer Trio

First flight of the three light trainers being evaluated by the Navy at Oceana Field, Pensacola, Fla., shows the planes as relatives. From left: Textron Photo, Beech Model and Ryan 72. This is the first measurement of Beech's in the competition. Photo was first shown in Aviation Week Oct. 6, p. 7 and the Ryan was covered Oct. 12, p. 28 and Nov. 2, p. 36. Navy is studying all three to determine which is the most suitable replacement for its North American SNJ.

Trans World Airlines has deposited \$4,638,800 in selling feed and interest payments due on \$40 million borrowed in 1946 from Equitable Life Assurance Society, cutting the loan to \$28,000,000.

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Continental Air Lines reports a net profit of \$1,101,127 for the first three quarters of 1955, approximately five times the \$238,073 net for the same period last year. Sharp increase reflects Continental's sale of its Convair 240 fleet. Operating revenues declined 8.21% to \$81,174,556.

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Carroll-Wright Corp., Wood Ridge, N. J., will pay a 13-cent dividend Dec. 24 to stockholders of record as of Dec. 8.

Brian Aerospace Co., San Diego, has declared a regular quarterly dividend of 10 cents on common capital stock plus an extra 10 cents, payable Dec. 31 to stockholders of record Nov. 30.

International

British Overseas Airways Corp. reported net profits of \$104,493 for the six months ended Oct. 10, a 564,400 drop from the same period last year. BOAC blames a decrease in U.S. Berlin passenger traffic for the lossy profit.

Sweden's Saab 92 all-weather jet fighter has reached intensive speeds in development, testing flight trials, spokesman for the company reports.

The two aircraft, powered by a Rolls-Royce Avon, is in quantity production at Saab Aircraft Co.'s Linkoping factory.

David Murray of Defense is negotiating for a nucleus of British Hawker Hunters, expect to spend approximately \$14,450,000 on the jet fighters and spares.

ZP2K
LANDING
GEAR
Airborne Actuated



The landing gear in Goodyear's ZP2K heavy landing is actuated by Airborne's K 545H. The ZP2K unit is 12% in weight. Airborne electro-hydraulic actuators are specified by Goodyear — and most other manufacturers of military aircraft — for two reasons: they provide high power output in a minimum of space, and they can be counted on, however rugged the conditions.

Dimension and data on Airborne products for the aviation industry are given in the IAS: *Aerospace Engineering Catalog*.



ACCESSORIES CORPORATION
 101 Chestnut Avenue
 Holmdel 5, New Jersey

The Aviation Week
 November 16, 1953

Headline News

Foggy Study Subsists: Military	14
CAA Tries Aircrew Operations	14
U.S. Eyes Known Wilkes-Barre Plant	15
Canada Has Back in CAA Reservation	15
New Gate Likely in AF Spending	16
NAA Reasons: Wing Engineering	16
ATA Stress: Quality Management	22
Foreign External Audit: Airline 29	27

Aerospace Engineering

Aircraft: Infantry Tops in Coloration	40
---------------------------------------	----

Financial

Why More Airlines Should Drop Off	42
-----------------------------------	----

Production

Proprietary Color Personality	44
-------------------------------	----

Airlines

AEDC Aims on Airplane Problems	51
--------------------------------	----

Equipment

Animated Panels Explain Controls	50
----------------------------------	----

Air Transport

Transits, Low Fare Italy ADA	584
------------------------------	-----

Editorials

Offshores Can Break Shipping Ties	531
-----------------------------------	-----

We See It Happen	534
------------------	-----

Four Free Sales	536
-----------------	-----

Let's Decide: Customers	538
-------------------------	-----

Departments

New Aircraft	7
--------------	---

Picture Page	9
--------------	---

What's What	11
-------------	----

Industry Review	11
-----------------	----

Washington Roundup	11
--------------------	----

Professional Briefs	61
---------------------	----

DRDO: Gouraud	64
---------------	----

F-84: Williams	64
----------------	----

Navy Contracts	66
----------------	----

Editor's Column	68
-----------------	----

Off The Beat	69
--------------	----

New Aviation Products	70
-----------------------	----

What's New	70
------------	----

Call: Divers	70
--------------	----

New Shorthops	71
---------------	----

Aviation Calendar	71
-------------------	----

Picture Credits

1-17: P. 10: 1-18: 1-19: 1-20: 1-21: 1-22: 1-23: 1-24: 1-25: 1-26: 1-27: 1-28: 1-29: 1-30: 1-31: 1-32: 1-33: 1-34: 1-35: 1-36: 1-37: 1-38: 1-39: 1-40: 1-41: 1-42: 1-43: 1-44: 1-45: 1-46: 1-47: 1-48: 1-49: 1-50: 1-51: 1-52: 1-53: 1-54: 1-55: 1-56: 1-57: 1-58: 1-59: 1-60: 1-61: 1-62: 1-63: 1-64: 1-65: 1-66: 1-67: 1-68: 1-69: 1-70: 1-71: 1-72: 1-73: 1-74: 1-75: 1-76: 1-77: 1-78: 1-79: 1-80: 1-81: 1-82: 1-83: 1-84: 1-85: 1-86: 1-87: 1-88: 1-89: 1-90: 1-91: 1-92: 1-93: 1-94: 1-95: 1-96: 1-97: 1-98: 1-99: 1-100: 1-101: 1-102: 1-103: 1-104: 1-105: 1-106: 1-107: 1-108: 1-109: 1-110: 1-111: 1-112: 1-113: 1-114: 1-115: 1-116: 1-117: 1-118: 1-119: 1-120: 1-121: 1-122: 1-123: 1-124: 1-125: 1-126: 1-127: 1-128: 1-129: 1-130: 1-131: 1-132: 1-133: 1-134: 1-135: 1-136: 1-137: 1-138: 1-139: 1-140: 1-141: 1-142: 1-143: 1-144: 1-145: 1-146: 1-147: 1-148: 1-149: 1-150: 1-151: 1-152: 1-153: 1-154: 1-155: 1-156: 1-157: 1-158: 1-159: 1-160: 1-161: 1-162: 1-163: 1-164: 1-165: 1-166: 1-167: 1-168: 1-169: 1-170: 1-171: 1-172: 1-173: 1-174: 1-175: 1-176: 1-177: 1-178: 1-179: 1-180: 1-181: 1-182: 1-183: 1-184: 1-185: 1-186: 1-187: 1-188: 1-189: 1-190: 1-191: 1-192: 1-193: 1-194: 1-195: 1-196: 1-197: 1-198: 1-199: 1-200: 1-201: 1-202: 1-203: 1-204: 1-205: 1-206: 1-207: 1-208: 1-209: 1-210: 1-211: 1-212: 1-213: 1-214: 1-215: 1-216: 1-217: 1-218: 1-219: 1-220: 1-221: 1-222: 1-223: 1-224: 1-225: 1-226: 1-227: 1-228: 1-229: 1-230: 1-231: 1-232: 1-233: 1-234: 1-235: 1-236: 1-237: 1-238: 1-239: 1-240: 1-241: 1-242: 1-243: 1-244: 1-245: 1-246: 1-247: 1-248: 1-249: 1-250: 1-251: 1-252: 1-253: 1-254: 1-255: 1-256: 1-257: 1-258: 1-259: 1-260: 1-261: 1-262: 1-263: 1-264: 1-265: 1-266: 1-267: 1-268: 1-269: 1-270: 1-271: 1-272: 1-273: 1-274: 1-275: 1-276: 1-277: 1-278: 1-279: 1-280: 1-281: 1-282: 1-283: 1-284: 1-285: 1-286: 1-287: 1-288: 1-289: 1-290: 1-291: 1-292: 1-293: 1-294: 1-295: 1-296: 1-297: 1-298: 1-299: 1-300: 1-301: 1-302: 1-303: 1-304: 1-305: 1-306: 1-307: 1-308: 1-309: 1-310: 1-311: 1-312: 1-313: 1-314: 1-315: 1-316: 1-317: 1-318: 1-319: 1-320: 1-321: 1-322: 1-323: 1-324: 1-325: 1-326: 1-327: 1-328: 1-329: 1-330: 1-331: 1-332: 1-333: 1-334: 1-335: 1-336: 1-337: 1-338: 1-339: 1-340: 1-341: 1-342: 1-343: 1-344: 1-345: 1-346: 1-347: 1-348: 1-349: 1-350: 1-351: 1-352: 1-353: 1-354: 1-355: 1-356: 1-357: 1-358: 1-359: 1-360: 1-361: 1-362: 1-363: 1-364: 1-365: 1-366: 1-367: 1-368: 1-369: 1-370: 1-371: 1-372: 1-373: 1-374: 1-375: 1-376: 1-377: 1-378: 1-379: 1-380: 1-381: 1-382: 1-383: 1-384: 1-385: 1-386: 1-387: 1-388: 1-389: 1-390: 1-391: 1-392: 1-393: 1-394: 1-395: 1-396: 1-397: 1-398: 1-399: 1-400: 1-401: 1-402: 1-403: 1-404: 1-405: 1-406: 1-407: 1-408: 1-409: 1-410: 1-411: 1-412: 1-413: 1-414: 1-415: 1-416: 1-417: 1-418: 1-419: 1-420: 1-421: 1-422: 1-423: 1-424: 1-425: 1-426: 1-427: 1-428: 1-429: 1-430: 1-431: 1-432: 1-433: 1-434: 1-435: 1-436: 1-437: 1-438: 1-439: 1-440: 1-441: 1-442: 1-443: 1-444: 1-445: 1-446: 1-447: 1-448: 1-449: 1-450: 1-451: 1-452: 1-453: 1-454: 1-455: 1-456: 1-457: 1-458: 1-459: 1-460: 1-461: 1-462: 1-463: 1-464: 1-465: 1-466: 1-467: 1-468: 1-469: 1-470: 1-471: 1-472: 1-473: 1-474: 1-475: 1-476: 1-477: 1-478: 1-479: 1-480: 1-481: 1-482: 1-483: 1-484: 1-485: 1-486: 1-487: 1-488: 1-489: 1-490: 1-491: 1-492: 1-493: 1-494: 1-495: 1-496: 1-497: 1-498: 1-499: 1-500: 1-501: 1-502: 1-503: 1-504: 1-505: 1-506: 1-507: 1-508: 1-509: 1-510: 1-511: 1-512: 1-513: 1-514: 1-515: 1-516: 1-517: 1-518: 1-519: 1-520: 1-521: 1-522: 1-523: 1-524: 1-525: 1-526: 1-527: 1-528: 1-529: 1-530: 1-531: 1-532: 1-533: 1-534: 1-535: 1-536: 1-537: 1-538: 1-539: 1-540: 1-541: 1-542: 1-543: 1-544: 1-545: 1-546: 1-547: 1-548: 1-549: 1-550: 1-551: 1-552: 1-553: 1-554: 1-555: 1-556: 1-557: 1-558: 1-559: 1-560: 1-561: 1-562: 1-563: 1-564: 1-565: 1-566: 1-567: 1-568: 1-569: 1-570: 1-571: 1-572: 1-573: 1-574: 1-575: 1-576: 1-577: 1-578: 1-579: 1-580: 1-581: 1-582: 1-583: 1-584: 1-585: 1-586: 1-587: 1-588: 1-589: 1-590: 1-591: 1-592: 1-593: 1-594: 1-595: 1-596: 1-597: 1-598: 1-599: 1-600: 1-601: 1-602: 1-603: 1-604: 1-605: 1-606: 1-607: 1-608: 1-609: 1-610: 1-611: 1-612: 1-613: 1-614: 1-615: 1-616: 1-617: 1-618: 1-619: 1-620: 1-621: 1-622: 1-623: 1-624: 1-625: 1-626: 1-627: 1-628: 1-629: 1-630: 1-631: 1-632: 1-633: 1-634: 1-635: 1-636: 1-637: 1-638: 1-639: 1-640: 1-641: 1-642: 1-643: 1-644: 1-645: 1-646: 1-647: 1-648: 1-649: 1-650: 1-651: 1-652: 1-653: 1-654: 1-655: 1-656: 1-657: 1-658: 1-659: 1-660: 1-661: 1-662: 1-663: 1-664: 1-665: 1-666: 1-667: 1-668: 1-669: 1-670: 1-671: 1-672: 1-673: 1-674: 1-675: 1-676: 1-677: 1-678: 1-679: 1-680: 1-681: 1-682: 1-683: 1-684: 1-685: 1-686: 1-687: 1-688: 1-689: 1-690: 1-691: 1-692: 1-693: 1-694: 1-695: 1-696: 1-697: 1-698: 1-699: 1-700: 1-701: 1-702: 1-703: 1-704: 1-705: 1-706: 1-707: 1-708: 1-709: 1-710: 1-711: 1-712: 1-713: 1-714: 1-715: 1-716: 1-717: 1-718: 1-719: 1-720: 1-721: 1-722: 1-723: 1-724: 1-725: 1-726: 1-727: 1-728: 1-729: 1-730: 1-731: 1-732: 1-733: 1-734: 1-735: 1-736: 1-737: 1-738: 1-739: 1-740: 1-741: 1-742: 1-743: 1-744: 1-745: 1-746: 1-747: 1-748: 1-749: 1-750: 1-751: 1-752: 1-753: 1-754: 1-755: 1-756: 1-757: 1-758: 1-759: 1-760: 1-761: 1-762: 1-763: 1-764: 1-765: 1-766: 1-767: 1-768: 1-769: 1-770: 1-771: 1-772: 1-773: 1-774: 1-775: 1-776: 1-777: 1-778: 1-779: 1-780: 1-781: 1-782: 1-783: 1-784: 1-785: 1-786: 1-787: 1-788: 1-789: 1-790: 1-791: 1-792: 1-793: 1-794: 1-795: 1-796: 1-797: 1-798: 1-799: 1-800: 1-801: 1-802: 1-803: 1-804: 1-805: 1-806: 1-807: 1-808: 1-809: 1-810: 1-811: 1-812: 1-813: 1-814: 1-815: 1-816: 1-817: 1-818: 1-819: 1-820: 1-821: 1-822: 1-823: 1-824: 1-825: 1-826: 1-827: 1-828: 1-829: 1-830: 1-831: 1-832: 1-833: 1-834: 1-835: 1-836: 1-837: 1-838: 1-839: 1-840: 1-841: 1-842: 1-843: 1-844: 1-845: 1-846: 1-847: 1-848: 1-849: 1-850: 1-851: 1-852: 1-853: 1-854: 1-855: 1-856: 1-857: 1-858: 1-859: 1-860: 1-861: 1-862: 1-863: 1-864: 1-865: 1-866: 1-867: 1-868: 1-869: 1-870: 1-871: 1-872: 1-873: 1-874: 1-875: 1-876: 1-877: 1-878: 1-879: 1-880: 1-881: 1-882: 1-883: 1-884: 1-885: 1-886: 1-887: 1-888: 1-889: 1-890: 1-891: 1-892: 1-893: 1-894: 1-895: 1-896: 1-897: 1-898: 1-899: 1-900: 1-901: 1-902: 1-903: 1-904: 1-905: 1-906: 1-907: 1-908: 1-909: 1-910: 1-911: 1-912: 1-913: 1-914: 1-915: 1-916: 1-917: 1-918: 1-919: 1-920: 1-921: 1-922: 1-923: 1-924: 1-925: 1-926: 1-927: 1-928: 1-929: 1-930: 1-931: 1-932: 1-933: 1-934: 1-935: 1-936: 1-937: 1-938: 1-939: 1-940: 1-941: 1-942: 1-943: 1-944: 1-945: 1-946: 1-947: 1-948: 1-949: 1-950: 1-951: 1-952: 1-953: 1-954: 1-955: 1-956: 1-957: 1-958: 1-959: 1-960: 1-961: 1-962: 1-963: 1-964: 1-965: 1-966: 1-967: 1-968: 1-969: 1-970: 1-971: 1-972: 1-973: 1-974: 1-975: 1-976: 1-977: 1-978: 1-979: 1-980: 1-981: 1-982: 1-983: 1-984: 1-985: 1-986: 1-987: 1-988: 1-989: 1-990: 1-991: 1-992: 1-993: 1-994: 1-995: 1-996: 1-997: 1-998: 1-999: 1-1000: 1-1001: 1-1002: 1-1003: 1-1004: 1-1005: 1-1006: 1-1007: 1-1008: 1-1009: 1-1010: 1-1011: 1-1012: 1-1013: 1-1014: 1-1015: 1-1016: 1-1017: 1-1018: 1-1019: 1-1020: 1-1021: 1-1022: 1-1023: 1-1024: 1-1025: 1-1026: 1-1027: 1-1028: 1-1029: 1-1030: 1-1031: 1-1032: 1-1033: 1-1034: 1-1035: 1-1036: 1-1037: 1-1038: 1-1039: 1-1040: 1-1041: 1-1042: 1-1043: 1-1044: 1-1045: 1-1046: 1-1047: 1-1048: 1-1049: 1-1050: 1-1051: 1-1052: 1-1053: 1-1054: 1-1055: 1-1056: 1-1057: 1-1058: 1-1059: 1-1060: 1-1061: 1-1062: 1-1063: 1-1064: 1-1065: 1-1066: 1-1067: 1-1068: 1-1069: 1-1070: 1-1071: 1-1072: 1-1073: 1-1074: 1-1075: 1-1076: 1-1077: 1-1078: 1-1079: 1-1080: 1-1081: 1-1082: 1-1083: 1-1084: 1-1085: 1-1086: 1-1087: 1-1088: 1-1089: 1-1090: 1-1091: 1-1092: 1-1093: 1-1094: 1-1095: 1-1096: 1-1097: 1-1098: 1-1099: 1-1100: 1-1101: 1-1102: 1-1103: 1-1104: 1-1105: 1-1106: 1-1107: 1-1108: 1-1109: 1-1110: 1-1111: 1-1112: 1-1113: 1-1114: 1-1115: 1-1116: 1-1117: 1-1118: 1-1119: 1-1120: 1-1121: 1-1122: 1-1123: 1-1124: 1-1125: 1-1126: 1-1127: 1-1128: 1-1129: 1-1130: 1-1131: 1-1132: 1-1133: 1-1134: 1-1135: 1-1136: 1-1137: 1-1138: 1-1139: 1-1140: 1-1141: 1-1142: 1-1143: 1-1144: 1-1145: 1-1146: 1-1147: 1-1148: 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WHO'S WHERE

In the Front Office

John E. Robins, chairman of the Communications Air Transport Board, has been appointed to the Board of Directors of the American Telephone and Telegraph Co. to serve as an advisor to the Department of Transport.

William A. Peterson, president of United Air Lines, has been elected to the board of Westinghouse Electric Corp., New York. Ramsey C. Amstutz is now chairman and president of the new division of the Cold, ammonia Elmo W. Bright, who helped to establish Eagle Laboratories at North Hollywood. Willis W. Benson, Jr., is Benson's treasurer and comptroller.

Ralph L. Moulder has been appointed president of Minnesota Electronics Corp., St. Paul.

William F. Young has been appointed vice president of Aeritalia Supplies, Natick, Mass.

Rowe Atkin, G. A. T. Workhouse, former Naval aviator, has become special assistant to the president of Tropic Products, Los Angeles.

Changes

Ed Wing, Caud. G. Lee has moved as deputy director of Battelle's National Gas Test Laboratory, Seattle.

Chic Faxon has been promoted to cap racing director at the Aeromotors Division of Minneapolis-Honeywell Regulator Co., Minneapolis.

Marvin A. Bennett has been appointed senior manager of the Gas Turbine Division of the Aeromotors Division & Engineering Co., Detroit.

Robert B. King is new production manager of engine manufacturing at Ford Motor Co.'s Aeromotors Division, Chicago.

Walter R. Powell has become senior project manager of the Aeromotors Division, Aeromotors Division, Chicago. Samuel Gross has joined the Electrical Equipment Division, Orange, N. J., as plant supervisor.

Wendell Adams is new manager of sales field service and customer information for Ford Aeromotors Division Manufacturing Div., Dearborn, Mich.

Col. Stanley R. Stevens (USAFA Ret.) has joined the Electronic Specialty Co., Los Angeles, as sales director.

William F. Bales has been appointed manager of Transonic Aircraft Corp., Corbeau, Tex., plant. Other nominees: Herold W. Baldwin, plant manager at Casselton, Tex.; John T. Berlin, assistant plant manager at Corbeau; W. N. Stahl, assistant manager at Corbeau; and E. B. McAdoo, tooling supervisor at Dallas; Doyle Bradley, chief metal supervisor at Dallas.

Honors and Elections

G. R. Stagg, chief project engineer at Douglas Aircraft Co.'s Santa Monica (Calif.) Division, and Harold Lusk, research chief of the Douglas aerodynamics section, have been cited by the University of Michigan for "outstanding achievement and contribution to the field of engineering."

INDUSTRY OBSERVER

►Convair has split the defensive weapons system for its XB-58 interceptor bomber into two development packages, with Entomac receiving the aircraft and the associated phase and Sylvania doing the electronic equipment. These two contractors replace General Electric which had been negotiating with Convair originally to develop the complete defensive system (Aviation Week Nov. 2, p. 10).

►The Bell Helicopter Co. has begun production tooling for the Convair 5 and no further changes are expected in the general configuration of the latest in this jet transport series, although some design details are not yet firm. De Haan has settled on a single-seat configuration for the new Convair rather than the double-seat favored by the U.S. Civil Aeronautics Administration. (Flight Convair 5 is expected to fly as of July 1 of next year.)

►Portuguese planners will concentrate next fall on off-shore procurement of military aircraft for the NATO countries on all major fighter types with very little, if any, further money going to fighter types. Lack of adequate all-weather fighters is a serious NATO deficiency in view of the growing strength of the Russian jet bomber fleet in Eastern Europe.

►Powerplant installations Subsidiaries of the Aircraft Industries Assn. has developed detailed recommendations on oil coolers for turboprop engines which have been manufactured in the Navy Bureau of Aeronautics for the preparation of a military specification. Oil cooler manufacturers cooperated with AIA in the study.

►Propeller manufacturers have won a partial victory in their fight to get specific helicopter propeller types designed to fit for helicopter propeller testing. The Army has now issued a memo to the Army Materiel Command which will be forwarded to each of the major types scheduled to do their part for in-flight test work. Low priority projects will continue to be dependent on tailwings available only at Wright Air Development Center.

►Civil Aeronautics Administration has indicated Aircraft Industries Assn. it considers deployment of the option allowing manufacturers of small non-transport type helicopters to certify their own models at permanent location of the plant field state of allowability rules for helicopter (Aviation Week Oct. 12 p. 10).

►Allison Aeropropulsion Division of General Motors Corp. reports one of its J33-35 centrifugal flow turbojets recently completed 1,200 hours of rated output operation, time passing a Lockheed T-33 in Korea. The J33 was shipped from Allison in 1952 and has gone through 100 hours of field service, 100 hours in Korea and 100 hours at a location between Allison and Lockheed. Allison also reports that another J33-35 installed in a Lockheed T-33 has operated for 3,000 hours without repair.

►Ford USAF focuses on the workload of fighters in Korea shows the Lockheed F-80 Shooting Star was the jet workhorse, flying 35% of the 276,776 jet fighter sorties completed during the three-year war. North American F-86 Sabre and Republic F-84 Thunderjet each accounted for 31% of the sorties with the remaining 3% credited to Lockheed F-94 all-weather interceptors.

►Project to increase the range of the Hawker Hunter to 30 degrees and boost power to the 18,000-foot mark thrust of the Rolls-Royce R.A. 16 Avon has been shifted to the British Ministry of Supply after the prototype aircraft was finished. British officials believe this may mean a new version of the Vickers Supermarine Swift, the powered by the R.A. 16, may have won the next competitive round for Royal Air Force production orders.

►Piascki Helicopter Corp. is considering powering its third experimental prototype YH-36 twin-engine transport helicopter with Allison T56 turboprop rated at 3,750 shp. The second prototype is nearing completion with the Allison T56 turboprop rated at 2,750 shp as its powerplant.

Washington Roundup

Service Secretaries Speak Up

Captain Bill Sherman, memorandum to service secretaries speaking in Senate, was surprised when Assistant Air Force Secretary H. Lee Lee (representing Secretary Harold Talbott) and Army Secretary Robert Stevens opposed Defense Secretary Charles Wilson's views, and insisted in terms of military mix for service acquisition. It's the first time since the inception of the 1947 National Act that the Secretaries have taken issue with the Secretary of Defense—without independent congressional inquiry.

Wilson dismissed the Sherman-White contention. "Well, that's what they said, and that must be their opinion. We try to let everyone use their own judgment to the maximum."

Carney Favors Nuclear Power

Chief of Naval Operations, Adm. Robert Carney, openly is challenging Secretary Wilson's decision regarding development of a nuclear powerplant for aircraft. Navy should start converting all its major ships from oil to nuclear power now, he maintains.

Defense Budget Timing

The fiscal year 1955 defense budget is being revised to completion so it can be included in the final budget that will go to Congress shortly after the beginning of the year. This year, the new Administration's revised budget didn't go up until May, and it was August, a month after the start of the fiscal year, before the services had final 1954 figures available.

Defense Secretary Wilson wanted to submit only a total defense appropriation estimate to Congress. But he was overruled by the President, an budget pressuring which would take five to six months, is being telegraphed now two and a half months.

As mid-October, National Security Council testifies that a status quo base level of 16 air carrier groups for the Navy and boosted the USAF base level from 120 to 137 wings.

• The services are due to submit their estimates to Congress now to reduce competitive W. J. McNell by Dec. 5.

• The estimates will be reviewed jointly by the Budget Bureau and McNell's office in the following three weeks, with NSC making final decisions. Wilson predicts that the difference between service estimates and Defense Department estimates will be less than \$5 billion.

New Air Defense Study

A new air defense study has just been completed for the National Security Council by a committee headed by Lt. Gen. Harold Bell. The committee leans toward the military position that air defense should be built around from U.S. bases. Civil Defense Administration believes the major defense effort should be devoted to early warning systems in the Arctic.

Guided Missile Evaluation

A comprehensive report on the guided missile programs, due to be submitted to the Secretary of Defense Dec. 1, will make recommendations on developmental projects, and gaps in the programs that should be filled

It is being drawn by a nine-member inter-service committee headed by Trevor Gordon, special assistant to the Secretary of Air Force for research and development (AVIATION WEEK Aug. 31, p. 11). The review has been going on for more than four months. Their report, which will be turned over to Assistant Secretary for Research and Development, Donald Quisenberry, and Assistant Secretary for Applications Engineering, Frank Newberry, is expected to be submitted.

ODM: Fifth Wheel?

Office of Defense Mobilization seems to be the only service looking in.

- ODM's directive on "packaging" machine tools in aircraft plants where they would be used in an emergency implements Defense Department policy.
- ODM's coming directive on defense contract awards in manpower surplus areas is expected to be a revision of already established policy.

- Defense Department seems to be taking seriously ODM's same task of drawing up an all-out mobilization plan. ODM has asked Defense to submit the full mobilization plan to the chairman of the military and defense by Nov. 15. Asked about this, Secretary Wilson said he was unaware of it, and added, "I support it in a certain mobilization study."

Rail Target: Bonanza

Railroad interests are angling out Bausch Air Lines for attack in their campaign against subsonic. One rail spokesman said, "The rail road managers" and transportation officials for Bausch, who originally planned to fly its route, have been embarrassed by 39,973,303 for the current year. Of the total, \$46,000 is taken in advance and now. The remaining \$93,803, representing more than 95% of the total, consists of safety.

Hoover's Error?

Civil Aviation Board members are critical of former President Herbert Hoover's reasoning for abolishing independent agencies. Hoover said that there are 40 to 50 independent agencies and that it is President Truman's job to decide which ones are unnecessary. He also said that the CAVB would be able to do its work in 70 to 80 hours a week. The points are made that there are only about 12 significant independent agencies and that the President is not supposed to participate in the actions of the quasi-judicial regulatory agencies, the exceptions being CAB international cases.

More Defense Secretaries?

Outlook is that the Pentagon's corps of secretary-level officials, which now totals 25, will keep growing.

- Secretary Wilson has indicated he will ask Congress for legislation authorizing another assistant secretary to handle procurement for both of the services.
- The general staff of 23 doesn't give a complete picture. "Special interests" and "mentors to the services" who report to the Secretary and have approximately the rank of assistant secretary, have been appointed—and more probably will be. For example, on Defense Department's organization chart, the "Assistant to the Secretary for Atomic Energy" has equal status with the assistant secretaries.

—Katherine Johnson

Air Policy Study Sidesteps Military Issues

- First review since 1948 centers on civil aviation; some critics see little prospect of concrete results.
- Aircraft industry forecasts major airpower crisis will result from lack of adequate planning for services.

By Robert Flora

First step since 1948 to formulate a national air policy got underway last week in Washington.

An Coordinating Committee appointed a special liaison group to draw the policy study and released a policy agency, the National Air Transportation Council (Oct. 3, p. 17). The liaison effort would be concentrated on the civil aspects of aviation without attempt to deal with the hot political issue of strategic military airpower.

Members of the ACC special liaison group:

- Charles D. Clay, executive secretary, ACC
- Bradley Nash, USAF
- J. T. Fyle, Navy
- James D. Davis, Army
- Fred T. Everitt, State Department
- Fred D. Lee, Commerce Department
- Stanley Thompson, Civil Aeronautics Board
- Jim H. Abbott, National Advisory Committee for Aeronautics
- Bill Wadsworth, Post Office Department

Representatives for the Treasury Department has yet not been named. This group has asked the aircraft industry, airlines and any other interested parties to submit their written comments on both the proposed scope of the study and on their position regarding any specific item on the agenda. There will be no public hearings.

All four congressional committees must be summoned as working to Charles C. AGC places to have a hearing and for the study. It will depend on the special liaison group who members all have other full-time government jobs. Eddie Jackson, director of the study, told *EW* that the study might be completed by early next year but would take a tight date of late next spring or early summer unless more likely.

- Industry: Industry-industry meeting to the AGC agenda was characterized by general indifference, based on the feeling that this is just another of the many "ad hoc" studies which the Eisenhower Administration has been

substituting for legislative action and that it little prospect of any concrete results from the survey.

There is the same finding that the ACC study is narrowing its scope to civil aviation, has gone away from the original intent of President Eisenhower's letter which specified a "comprehensive" study of development and the overall fiscal policies of the Blackhawk Administration.

• Rule of U.S. air transportation system:

- Nonmilitary airbus operations
- Policies and standards to be defined in establishing air route patterns
- Movement of mail by air
- Air cargo operations and development
- Federal government use of U.S. railroads and commercial air transportation
- Air transport mobilization planning
- Airports
- Federal and airport grants. Continuation of assessment of existing programs
- Review of primary recommendations of the President's Airport Commission (Bridle Report)
- Free availability use of airports
- Airport design, territory, Rights of U.S. aircraft use on such airports
- Airways
- User charges policy with respect to aeronautical facilities and services

- Development and implementation of a common air traffic control system of air traffic facilities and services
- Review of domestic airways system in terms of division of responsibility among federal government, local governments and industry
- Aeronautical communications
- International air traffic
- Prevention of such as air navigation
- International exchange of air transport rights
- Policies Abroad—Pentagon claims emphasized that many of the index told, mobilization and procurement policies of the previous Administration have been abandoned without any new programs to take their place. Full effect of the \$4-billion cut in the fiscal year 1954 aircraft procurement budget will be felt by the industry in 1956.

• A spokesman for the Aircraft Industries Association admitted that *EW* "was right" to say the industry would be bypassed this year in lead off of the impending crisis, but indicated that AGC was not right if "the time was ripe" for a public focus on the need for a full-scale development of an adequate military airpower policy.

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cost improvements pertaining to international flights.

• Economic and technical assistance: Action in the multilateral (ICAO) and bilateral fields.

► Aircraft and Equipment Manufacturer and Sales

• Sale of federal government's fleet of aircraft and new transport aircraft.

• Sale of U.S. aircraft and aerospace equipment abroad.

• Sale of foreign aircraft and aerospace equipment in the U.S.

► Aviation Safety

• Federal government's role in the field of aviation safety.

• Control and coordination of search and rescue teams.

► General Aviation

• Personal aircraft: Development of aircraft processing increased safety and operating economy.

• Aviation training: The federal government's role in training flight and technical ground personnel.

• Aviation education and information: The federal role in these areas.

► Federal-State-Local Relationships

• State airports in the regional field: Protection by states of aviation safety standards, sufficient to state of federal government's safety regulations.

• Economic regulation: air transportation, Federal-state relationships in that field.

• Multiple state function of aviation operations.

• Function of control over airports is among the federal, state and local governments and private interests.

► Research and Development

• Aeronautical research and development programs in the field of civil aviation.

gional administrators, who will propose cuts in the regional "user impact committee" of Air Coordinating Committee.

► CAA photographic lab shutdown is the latest annual cut. The 10-man staff has received notice of employment termination as of Dec. 31. The Washington facility did photographic work for government safety and research manuals, CAB rulemaking investigations and other aviation intelligence services.

► CAA Personnel Losses—Employee "reductions in force" are employing many copies of CAA headquarters in Washington as well as field offices. Assistant Administrator S. A. Kemp says that CAA employment dropped from 15,372 as of July 1, 1972, to about 14,000 as of July 1, 1973, and the total has dropped further than that number and still. Estimate of further reductions in force by CAA staff depends on decisions being made next week, he said.

To soften the blow, CAA recently issued a freeze on filling vacancies awaiting down reassignments. Hiring to 43 is currently suspended for approval of either the administrator or his assistant.

► Shutdown of approximately half of the steady generation car maintenance and seasonal auto, mobile and aircraft maintenance units, totaling 3,100,000 sq ft. CAA has granted a continuing freeze for the time facilities for use of regional administrators in communities which local authorities justify shutdowns.

► Airline telephone lines to Air Traffic Control service now must be paid for by the airlines, CAA has advised. Air Transport Assn. Savings is estimated at about \$14,000 a year. Other similar savings are in preparation, sources officials revealed to Aviation Week. These savings of complete private services are in addition to CAA's proposal to have "user charges" for its overall public services.

► Low-expense wages and compensation packages are under review by no-

thing cannot expect us, therefore, to perform every service which might be desirable. What you do have a right to expect is that CAA will perform every service which is essential in terms of our responsibility for public safety."

GM Buys Kaiser's Willow Run Factory

Kaiser Motors Corp. last week sold its big Willow Run, Mich., plant to General Motors Corp., the lowest bidder, for \$50 million. Kaiser's proceeds of the sale will go to pay a major part of Kaiser's continuing indebtedness to the government.

After a \$50-million fire destroyed its Livonia, Mich., High Voltage plant earlier last August, General Motors leased 1.5 million sq ft of factory space at Willow Run. Requests to lease 50,000 additional sq ft of space this month set off a race that a site was available.

► **Secret Felt-Herrero**—Edgar F. Kauer, president of Kaiser Motors, called for half-hour news briefs on a top level, highly secret basis. GMA got the bid and gradually will take over the Willow Run plant within the next 12 months.

The 6,000,100 sq ft Willow Run plant, located in the world's first factory town, was built during World War II. Ford Motor Co. sold it in 1945. Liberator bombers in the first plane until Kaiser-Frazer Corp. bought it in 1945 from Reconstruction Finance Corporation in order to produce automobiles.

Kaiser bought the plant three years later for \$153 million and produced both cars and Ford's C-419 piston ATC transport plane. The company had another assembly of a second Cessna C-121B assault transport before Air Force canceled the C-121B and C-122 contracts last June 28, p. 16.

Kaiser will sell both assembly lines and related equipment and move from Willow Run to its Toledo, Ohio, plant where it has more than 5,000,000 sq ft of manufacturing area available.

► **Loss Reduced**—With the sale proceeds plus an additional \$613,000, Kaiser will reduce its government loans to \$15,641,000. At our time the firm owed the government \$74,709,681, borrowed for automobile production. The authority cited of the remaining amount, the company said, has been shortened from 1968 to 1979.

CAB officials presently have 7,000 problems of work to be leased space at Willow Run. That committee recently turned over its first Willow Run-half transmission, 12 weeks after the Livonia fire.

"200 good wings by that date" he said. "I had thought the world would fit 114. They have got a lot of things in the Air Force to improve and balance their program. When they realized something wasn't right they found ways to fix it and promptly took the necessary steps."

Wilson reiterated his hope that "our total defense effort is at or near the peak." Military needs will still substantially the same as they were nine months ago, he said, but a reduction of supporting personnel is expected to be achieved shortly.

Stroukoff Negotiates For Chase Contract

Strookoff Aircraft Corp., West Trenton, N.J., is negotiating with Air Force to obtain a research and development contract formerly held by Chase Auto Credit Co. for a power-housed transport hydrofoil version of the C-121B.

USAF radar awarded Chase's other research contract for a boundary layer control aircraft for the C-121B to Strookoff. The contracts have been held in abeyance since the split of Chase (Aviation Week Sept. 7, p. 14) into two companies, Strookoff and the Kaiser Motors Corp.-owned Chase company.

Canada Strikes Back At CAB Restriction

Toronto—Canadian Air Transport Board has ordered Canadian Airlines and Pan American World Airways to show cause by Dec. 15 why they should be permitted to continue using the same aircraft for serving Canadian points as are used on trans-Atlantic flights.

The ATB under Sir Arthur lack at Civil Aerometrics Board's refusal to allow Trans-Canada Air Lines to use the same aircraft for serving weekly Montreal-Monterey City services as are scheduled for the Toronto-Montreal-Toronto operation.

► **TCAL New Service**—Scheduled to start Oct. 31, has been delayed indefinitely (Aviation Week Nov. 3 p. 7).

Colonial operates services from New York to Montreal, from Washington to Ottawa and Winnipeg to Montreal, the latter two with the same plane. PAA flies from Seattle to Fairbanks, Alaska, via Whitehorse, Yukon territory; patterned Seattle-Whittier and Whitehorse-Fairbanks. Start interpretation of regulations under the air transport agreement signed by the two governments at Ottawa four years ago 1979 would late passengers to disappear at Whitehorse and go through Fairbanks again to complete their passage.



Ray C. Stroukoff

Hinshaw to Receive 1953 Wright Award

Rep. Carl Hinshaw (R, Calif.) has been designated by the National Aviation Association to receive the 1953 Wright Brothers Memorial Trophy, for advancing the science and contributing growth of aviation in all its forms."

Hinshaw has been prominent as a spokesman for aviation during his 13 years in Congress, serving as chairman of the House Committee on Science and Astronautics and as chairman of the Air Force subcommittee on the International Civil Aviation Organization. He is a member of the Society of Automotive Engineers and Institute of the Aeronautical Sciences.

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FORRESTAL'S CANTED DECK TO SAVE \$3 MILLION

Redesign of the flight deck on the Navy's new aircraft carrier USS Forrestal is expected to canted configuration is expected to cost \$3 million as cost of building the ship. Artist's conception of the carrier deck.

New Cuts Likely in AF Spending

Tighter fiscal and inventory control probably will reduce aircraft spares, parts and engine procurement.

Reductions in aircraft spares, parts and engine procurement requirements of the Air Force are in prospect as a result of closer fiscal control.

House Armed Services panel of experts by Assistant Air Force Secretary for Management, Lt. Gen. White, to Senate Armed Services Subcommittee investigating failure of the three unions in four years to implement adequately legislation aimed at putting Defense Department as a leaner, life financial basis.

• **Through application of new techniques for refining requirements for aircraft spares parts to available physical and financial assets.** USAF concluded during fiscal 1953 that money on hand from prior year's appropriations "went in excess of \$1 billion in requirements."

USAF is now taking steps to implement savings will be realized" by the tighter fiscal and inventory control reflecting procurement requirements, White told the subcommittee.

• **Re-computation of engine-life expectancy in the B-47 program,** which resulted in the elimination of 4,000 powerplants costing \$200 million, White reported. In the first step toward USAF's objective of increasing engine requirements through more exacting inventory control, because of suspended contracts in aircraft, parts and related facilities, he estimated the total savings on the B-47 program to be approximately another \$100 million. Under AF's re-computation, applying selected methods, the life expectancy of the J47 was increased from 150 to 300 hr. The same actual computation now is being applied to other engines under procurement, White said, "and further comparable savings are being achieved."

• **By the end of the year, USAF will be ready to put Military Air Transport Service on an independent working capital basis, after the pattern of Military Sea Transport Service.** MSTS was chartered with an initial capitalization, and a working capital—Army, Navy, Air Force—of \$200 million.

What made it clear that Air Force has not made a definite decision to go ahead with the change in MSTS management. Until this year, USAF has balked at taking this step in this direction, and had its way. But Defense Secretary Charles Wilson seems determined to end the change, and the House Appropriations Committee, which reported its severe difficulties of MSTS management that spring, is likely to insist on it.

• **MSTS Cited.**—"Working capital funds within the Department of Defense have given the Department of Defense a great deal of value," White told House subcommittee. "An outstanding example of MSTS—which because of its constant operating efficiency provides under headings like management and financing, is using the taxpayer \$200 million annually."

Members of the House and Senate Appropriations Committees have been dissatisfied with Air Force's method of computing the obsolescence of planes, finding that the period set—a year for transports, five years for bombers, three years for fighters—was too short. But White told *Air Force* White that USAF does not now intend to recompute the numbers.

Some re-organization of the military procurement fiscal policies should come as a result of an earlier probe of the Korean assassination slayings, which disclosed inventory control failures were using largely loose fiscal control.

• **Fiscal Gaps.**—There are some of the gaps in military fiscal methods that make it difficult for Congressmen to evaluate programs and come up with realistic decreases in appropriations funds.

• **Cost separation of depot operation is inadequate, and it is difficult to compare the expenses costs of one depot with another either in the same or in other services.**

• **Funds for aircraft spares parts are listed under so many budget headings that, at best, detailed records are required to ascertain the total outlay in this category.**

• **Even with breakdown of complete aircraft under the major head "Aircraft and Related Procurement" in USAF's budget, it is not possible to ascertain precisely the outlay for planes.** The complete aircraft category includes funds for such items as aircraft, travel, transportation, communications, supplies, tools and utility services. "Other categories are funds and structures, bases and armaments."

• **Estimates Off-Expenditure** estimates of the military have been notably off-base. For example:

• **In January 1952, Defense Department reported that expenditures for aircraft and related purchases for the coming fiscal 1953—1st start July 1, 1952—would be \$5 billion.**

• **By January 1953, with six months of the fiscal year past, the department changed its expenditure estimate to \$4.5 billion.**

• **Current estimate is that fiscal 1953**

expenditures for aircraft and related procurement amounted to \$6.5 billion.

On the nose of organization for fiscal financial control there were these developments at the Senate hearings:

- Defense Secretary Wilson backed up the position of Navy Secretary Robert Anderson that the financial structure of each service must be improved by a central comptroller. This is the present setup in the Navy. Undersecretary of Navy Thomas Gates is comptroller. Capt. Adm. E. E. Gleason, and a civilian, N. P. Cassidy, serve as assistant comptrollers, respectively to Gates.
- Air Force and Army opposed this and argued for a military comptroller, reporting jointly to the chief of staff and the secretary of the service through an interim successor. Lt. Gen. Charles B. USAF, USAF comptroller, now reports to the AF chief of staff and Assistant Secretary White.

Presenting USAF's case, White argued that odds are in favor of a military comptroller. "It should be about a \$15,000 per year savings." He claimed that through fiscal responsibility, the military can have a background of cost consciousness when it comes to itemized posts. White conceded that a civilian probably would have greater independence but said this one factor is not sufficient to tip the scales against a military comptroller.

NAA Resumes Wage Bargaining With Union

Los Angeles—North American Aviation and United Auto Workers (CIO) last week reached joint negotiations aimed at ending the wage walkout that halted production at NAA plants in California and Ohio.

Federal mediator John Foster reported no agreement at midweek.

Meanwhile, North American announced that nearly 5,000 employees had crossed the picket lines to return to work at all plants.

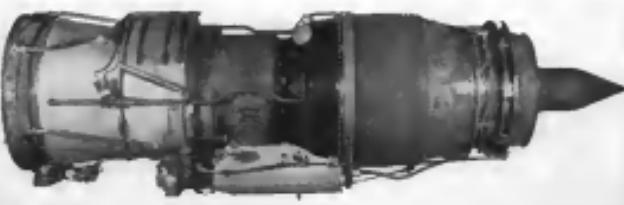
"We don't pretend we are pushing planes out the doors," said a company spokesman. "But we are back at work at almost all departments."

The union disputed NAA figures as the number returning to work. West Coast representative John Alford told "Instead of growing, the number of those reporting to work is undoubtedly less than in all plants last week."

The labor scene elsewhere in the industry was relatively quiet.

Lithiaire Aircraft Corp. workers, represented by the International Association of Machinists (AIM), rejected the company's latest wage offer by a 5-to-1 margin but voted to live in suspense of negotiations. Bargaining folks who were under way at Douglas Aircraft Co.'s Santa Monica plant,

AF Permits First Look at P&WA J57



EXTERNAL CONFIGURATION of P&WA split-compressor J57 engine at left is detailed in first photo released.

- **10,000-lb.-thrust class rating is confirmed.**
- **Jet gives U. S. two-year lead, producer says.**

U.S. Air Force liked a canary of the official severity song from the Pratt & Whitney Aircraft (PWA) turbjet last week by releasing external pictures and confirming its rating "in the 10,000-lb thrust class."

USAF explained that the "10,000-lb thrust class" meant that the J57 had reached the power out at more than during its official 150-hr test but that this did not constitute its official power rating. USAF declared to reveal the official J57 power rating on the grounds of military security. But industry sources indicated it was about 9,500 lb thrust for models currently being delivered to defense contractors.

• **Most Powerful.**—Concerning the USP's announcement, William P. Gandy, PWA general manager, said: "The J57 engine is the most powerful turbjet known to be in production. This engine is the first in aviation history to achieve a 10,000-lb power rating. We believe in Pratt & Whitney Aircraft that the J57 is at least two years in advance of any other engine we know of in the turbjet field. This includes British as well as American jet engines."

Gandy's statement was up to the usual from British sources who could cite the British Olympus with an official rating of 8,750 lb thrust and the Rolls-Royce R. 18 Avon officially rated at 9,000 lb thrust as equal to or, better than the J57 in overall rating.

• **Blue Chip.**—Engines The J57 is PWA's "blue chip" engine in the jet field with a long list of probable pros-



REAR VIEW of J57, showing rear of split-compressor turbojet's exhaust nozzle.



FLIGHT TESTS include taking B-52 off under North American B-52 bombers.



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'Dollar Barrier' Holds Pacific Air Tourists

An initial travel from the Far East to the United States is held to a minimum by a scarcity of dollars in the sterling block nations, says Sir Lalan and Indra, Air Vice Marshal at New Zealand and a member of the executive committee of the Pacific Air Travel Association, a group formed to foster travel in the Pacific area.

"Until the dollar barrier is overcome we can expect to see a large drop of holiday visitors to the U.S.," says Sir Lalan and Indra. The loss of earnings leaves the Far East in considerable, he believes, noting in an example that the set of 100 New Zealand citizens visited England last year.

► **THREE IN. TUBE.** — A New Zealand traveler going to the U.S. can buy in ticket in pounds but must obtain dollars for expenses. The number of pounds he is allowed to exchange for dollars depends on the importance of the trip. The world will be allowed more for a business journey than for a pleasure journey and on the current dollar balance enjoyed by the country.

The Pacific Air Travel Association, a 500-strong by 44 active members, with 16 governments, which pay a \$400 fee

and Alfred members, which include travel agents, hotel associations, railroads and shipping companies, are pushing for \$75.

Air National Guard Gets First F-86s

First aircraft of North American F-86 Sabre jet fighters, purchased by the Air Guard, USAF, officially delivered to the 116th Air National Guard (ANG) at Spokane, Wash. Mac. 2, p. 15), have been made to the 116th ANG National Guard fighters—members of the 116th F-86 Sabre Squadron of ANG's "Nosefile" wing headquartered at Spokane, Wash.

► **SPACER UNITS.** — The units are the 116th F-86 Squadron, Great Falls, Mont., and the 116th at Boise, Idaho. In the next few months other units, the 116th F-1 Skyraiders, Spokane and the 116th, Port Hueneme, Calif., the 116th, Madison, Wis., and the 116th, Milwaukee, Wis., will get their Sabres.

By the end of June 1955, 877 of the 27-wing Air Guard will have fighter squadrons (Aviation Week Oct. 26, p. 39). As the year ends, 1953, the Air Guard's adoption of Sabres and Hornets will be 100%. ANG officials say that in this fiscal year, \$35 million is scheduled to be spent on jet facilities.



INTERNATIONAL INTEREST IN UAL 'DOCK'

Increasing numbers from a number of international airlines are now viewing a model of a proposed air dock developed by United Air Lines for speedier handling of passengers and cargo. They are among the 22 top-ranking personnel who flew to UAL's Denver, Colo., operations base after the annual meeting of the International Air Transport Assn. in Montreal last month. Left to right are: Mr. R. B. Baskin, vice vice president, Bendixen-Arthur Systems; Dick Wulff, Van Arkayla, general manager, United Air Lines.

Aviation Asstn: J. D. Cradock, UAL engineer; Mr. Dick deGroot; S. D. Ryutoku, UAL director of design; Mr. G. V. F. Fokker; S. J. Ahola, president, Aero O/Y, Finland; G. A. K. K. Ziegler, president, Air France; Dr. Walter Borchfeld, president, Lufthansa; B. S. Shandor, chief engineer, British European Airways Corp.; Raymond Depay, vice president, Air France; Olo G. Johnson, general manager, Reliance Airlines; Gen. Lang Galle, director general, Lufthansa, Berlin.

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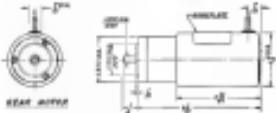
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Gold, Oct. 31 for the Far East.
• Lots of Holes—An F-104 has 600 holes to fix, an engine with the most through the Justice Department.

USAF attorneys have estimated that USAF's complaint has no chance in court since the case is already one of terminating a lease. No restraining order is involved, therefore, the Air Force cannot be enjoined from going ahead and reacquiring its plane aircraft.

THURSDAY, Air Force officials say the engine will have a "reasonable" period to return the aircraft if the new \$12,500 fine is not imposed.

Significant new leases for USAF's aircraft C-141s, the aircraft of choice at study in Air Force planners who have been rethinking the lease acquisition. One attorney and the leases had "lots of holes." And as a result of this study USAF has been able to increase its rentals.

ATA Stresses Quality Control, Management

Improved management methods and quality control were discussed by 3000 airline executives attending the Air Transport Ass'n's annual management and engineering conference at Miami Beach.

Discussions at the closed meeting of the conference revolved on two major aspects of management methods, according to Melvin Arnold, ATA vice president of operations and engineering:

• Personnel utilization, improvement and encouragement.

• Stock control, or maintaining materials availability with minimum inventory.

Standard quality control was the special emphasis, reports ATA engineering director Alex Duffy. He said this

ATA Agenda

Special engineering and maintenance meetings of Air Transport Ass'n members with manufacturers are scheduled by ATA for the period before the next annual meeting next year:

- United Aircraft Corp., Dec. 1-3
- Pratt & Whitney, United Air Lines
- Wright Aeronautical, January
- Federal Av. Lines
- Consolidated Vultee Aircraft Co., February
- Boeing Aircraft Corp., April
- Capital Airlines
- Douglas Aircraft Co., May
- Trans World Airlines
- Boeing Airplane Co., September
- Pan American World Airlines
- Glenn L. Martin Co., informal conference Eastern and Trans World Airlines

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in a major trend in present airline maintenance.

On material control, ATA officials indicate that attempts to reduce inventory were frustrated by the requirement of long lead-time cycles during the Korean war. But airline experts now feel substantial progress is in the future.

A report by the ground equipment subcommittee described standardization as imperative. Actual purchasing off can tags such a move, but on the spot maintenance men feel such a program would be filled with problems.

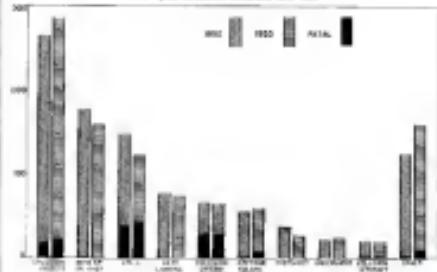
Dotterel pointed out that the new special meetings in addition to those already scheduled. A proposed meeting

to discuss aircraft extreme cleaning was called down. Progress of a meeting for standardization of maintenance and trades maintenance manuals and parts catalogs received a mixed reception and was tabled until next year.

Air Power Show

Latest aircraft show in the history of San Diego will be held Nov. 27 to mark the 10th anniversary of powered flight. Air Power Day demonstration will include USAF's FICON, static air launching and recovering a YRF-8B from an RB-57D (Aviation Week Aug. 13, p. 13), aerial refueling of a B-47 by a KC-97 tanker, an F-86 takeoff and an aeronautic exhibition in Navy Blue Angels.

TYPES OF ACCIDENTS IN NON-AIR-CARRIER FLYING 1950-1955 ACCIDENTS ANALYZED 1956-1963



Stalls Lead Non-Airline Crash Toll

Stalls still lead the fatal non-airline accident toll, and flying into the ground or sea ranks second. Most important, low-flying and high-speed flying accidents are on the rise and trailing off.

These are chief findings of a Civil Aerodynamics Board analysis of 1,000 accidents that occurred in 1952.

By type of operation, pleasure flying has the highest number of fatal and non-fatal accidents. In all types of flying there is little change in the toll from 1952 to 1955.

Table of accidents by type of flying looks down in following: Instructional, 45 fatal, 45 non-fatal, 45 total; pleasure, 58 fatal, 171 non-fatal, 229 total; non-commercial pleasure, 58 fatal, 171 non-fatal, 229 total; general, 113 fatal, 113 non-fatal, 226 total; recreation, 33 fatal, 22 non-fatal, 55 total; 56 fatal.

Commercial passenger, one fatal, 16 non-fatal, 17 total; eight fatal, eight non-fatal, one fatal, eight total; other, four fatal, 16 total.

Commercial, federal, none fatal, seven total; state, none fatal, two fatal, nonfatal, no accidents.

All other civil, 11 fatal, 28 total.

All civil accidents, 317 fatal, 1,000 total.

Fatal non-airline accident tolls using the group analysis for 1955-56, 45, ground collision, 30, roll over with objects, 25, mid-air collision, one, "flaming or bursting," 13, water landing flying, 27, landing approach, 17, takeoff and climb, 17, and night, 51.

In these fatal accidents, 185 planes were destroyed and 97 passengers were killed.

LEAR GIVES SURE CONTROL FOR COWL FLAPS

ON CONVAIR 340

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LEAR MODEL 340 SERVOMECH (above, above)

Conforms with three similar units to replace a positive, non-reversing engine cowl flap control system for the Convair 340. The entire assembly is powered by a common power source through a lever system of flexible shafting, which can be rotated to transmit power to additional actuators.

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Aviation Fuel Consumption*

The following projection of aviation fuel consumption through 1976 was compiled by an oil company official to show that the next three years will see a switch in demand from a urge to turbine fuel.

	(Millions of barrels)	Year	Turbine Fuel	Avgas
1952	23		35	
1953	25		35	
1954	34		35	
1955	106		35	349
1956	112		310	

*Figure cover worldwide civil and military consumption, except "non-oil" countries

Italy's Foreign-Backed Airlines Draw Fire

(By GENE M. WOOD, News)

Rome's spokesman for Italy's major Democratic-Christian Party has asked the Chamber of Deputies to force foreign capital out of state-owned Alitalia (LAI), financed by Texas World Airlines, and British-owned Avianca Italiana International (AII).

Aviation authorities have supported the deputy's demand, pointing out the Ministry of Defense is holding up a plan for strengthening civil aviation in Italy because of the need to be independent of nations with capital held to a large extent by foreign firms. TWA owns 60% of LAI (Aviation Week, Aug. 13, p. 10), and Alitalia is financed in part by British European Airways.

Apparatus Minister Giorgio Vassalli says the U.S. and British airline link up the Italian carrier as appendages of TWA and BEA.

In both LAI and Alitalia, he claims, management is not approved by a majority of directors but is for representing two-thirds of the capital—allowing the foreign owners to hold up any decision.

The deputy charges the two big transport companies were formed under by-products of the peace treaty and damage to Italy's laws, which require firms formed with mixed capital to elect a board of directors of two-thirds Italian membership.

► **559-MILES PROGRAM**—Aviation sources report the Ministry of Defense will ask the government for \$53 million to strengthen civil aviation in that country, and that foreign participation in LAI and Alitalia is strict.

The government will call for modernization of airports and sewage systems, expansion of domestic routes, and development of Italian transports.

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NEW JERSEY

AERONAUTICAL ENGINEERING



COMET MOVES ACROSS runway, showing characteristic low-disked wing. White-tipped tails a trademark with blue markings.



COMET STANDS ON THE APRON at Le Bourget Airport; this is the base for Air France's new fleet of jet transports.

First-year Report on . . .

How Air France Comet Training Works

By David A. Anderson

With the integration of tranship and helicopter transport operations with those of a piston-powered fleet it is now being completed by Air France, operator of the world's largest airline route and point network of the de Havilland Comet and Vickers Viscounts.

With three Comet 1A aircraft in service from Paris to Berlin, Cagliari and Algiers, and the main number of Viscounts on Continental runs, the French airline has progressed from first tranship to double operation in less than one year.

The extent of their Comet program for operations and maintenance, at the end of the first year, was told exclusively to Aviation Week recently at the Paris headquarters of the airline and at Le Bourget Airport, its Comet base.

► Fleet Since Air France purchased three Comet 1A (turboprop-powered aircraft with 44-passenger capacity) and has an option on three Comet 2s (turbopowered, 44-passenger aircraft) the future is 1958.

Six Viscounts will be delivered before the end of this year, and six more will follow next year. At the time of AVIATION Week's recent visit to Vickers' Weybridge plant, the ninth Viscount was nearing completion as the predecessor line.

The concern that Air France is making new use to buy certain operational experience with the new planes. While the aircraft are being delivered, those runs per week on the trial routes, additional routes are being studied in the light of continuing success in experience for future application of the turbine transports.

Further information had been obtained from RONC on economy, and in this, Air France had handed over its runway data to the French carrier.

Crash control bid route in the emer-

gencies exchange of information with the British, German, American, Canadian and Australian operators has helped both carriers in present day-to-day extension and future planning.

► Operations-Vinkel Page, assistant head of operations, said that a special group had been set up to survey the topography of numerous air routes that Air France would be flying with Comets. The information the group collected on economy characteristics, clear approaches, runway slopes, crosswind tolerances and altitudes, and the like was analyzed and incorporated into a data handbook for the testing of the aircraft.

Further information had been obtained from RONC on economy, and in this, Air France had handed over its runway data to the French carrier.

Crash control bid route in the emer-

Air France Training Program

For Comet Pilots

- Period 1/A:
 - A) Ground instruction, including
 - 1) Preflight inspection and checks
 - 2) Location and use of safety equipment
 - 3) Internal and external inspection
 - 4) Familiarization with equipment locations
 - 5) Starting the engines
 - 6) Familiarization with the radio
 - 7) Landing
 - 8) Takeoff, including use of brakes and ground steering. Checklist before takeoff
 - 9) Takeoff and landing
 - 10) Walk on the air
 - 11) Approaches at reduced speed, in straight lines and turns, at weight above the maximum landing weight.
 - 12) The same, with throttled engines
 - 13) Full stops, landing gear down, throttled engines
 - 14) 15 deg. Rps., landing gear extended, climb condition
 - 15) Full stops, landing gear down, 30 deg. turn in trim conditions
 - 2) Check to 10,000-40,000 ft, monitoring correct indicated air speed, and use of the Machmeter
 - 3) Climbing turns
 - 4) Level flight and turns at altitude
 - 5) Compensation in climbing
 - 6) Emergency operations by radio. Emergency operations in case of fuselage fire
 - 7) Use of automatic pilot and trim tabs
 - 8) Use of pilot's radio
 - 9) Use of fuel controls
 - 10) Use of automatic trim
 - 11) Effects of compressibility at 80 ft. Mach about 33,000 ft
 - 12) Use of articles at high Mach numbers
 - 13) Normal descent at 220 knots
 - 14) Turns at 20L
 - 15) Normal descent with no turns
 - 16) Emergency descent at 250 knots

Extensive study, again on an interchange basis. Very complete research for cruise control has been developed by the operations group and is used by Comet crews.

Michel Philibert, Comet operations captain, said that the work of the operations group began in September 1953, and that one of the crews was the preparation of a com-

prehensive manual on the dimension and performance characteristics of the aircraft.

Primary source for the data was de Havilland, and much additional material came from BOMC.

► Maintenance-Comet maintenance is done at Le Bourget, which has runways of sufficient length to handle the jet transports. A new runway is being

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GENERAL ELECTRIC jet engine maintenance and G-E technical personnel are located in 65 key locations across the United States. Tech reps and G-E key operational centers comprise a service network that brings G-E engineering within easy reach of G-E jet engine users.

How General Electric maintains peak turbojet



USAF REPRESENTATIVES conference with G-E technical representatives in seeking new ways to improve performance of G-E turbojets.



USAF ENGINEER, RAMS receives special engineering assistance from G-E technical personnel. Tech detail crews extend across the U.S.



G-E SERVICE EXPERTS Lee Reynolds and Brother Field, Kansas, modify G-E jet engines coming from plants in the United States.



ALVARADO CHAVES, Kansas, personnel are involved by G-E technical maintenance and inspection of G-E jet engines.

performance in the U. S.

Coast-to-coast Service Brings G-E Jet Engineering Into Field At 65 Key Locations

Highly trained G-E "trouble-shooters" provide engineering assistance at USAF bases, airframe manufacturers' plants, USAF overhead bases, G-E service shops, and at 65 key locations throughout the United States. Not only do these technical representatives assist in the solution of engineering problems in the field, they also seek to help improve jet engines still in the factory.

Coast-to-coast and throughout the entire world, G-E jet engines are ensured top performance at all times. In Korea, England, Germany, Puerto Rico, Alaska, Greenland, Holland, France, as well as the United States, G-E jet service engineers and specialists are available to make sure G-E engines perform properly. In the United States alone, 65 key locations are brought within easy reach of G-E maintenance by a nation-wide service network.

In addition to instructing USAF and airframe manufacturers' personnel in maintenance and parts ordering, tech reps submit technical reports on certain jet engines to factory engineers. These reports are carefully studied by development engineers and often result in design changes. Many of the improvements in the jet can be attributed to observations of G-E technical representatives in the field.

Following through on jet engines after they have left the plant means that no matter where a G-E jet engine goes, General Electric engineering goes with it. This is a vital resource to users of G-E turbojets of optimum performance throughout the life of the engine. *—GTE*



SPECIAL TEST OPERATIONS provide means for G-E tech reps to record engine performance under severe conditions.

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200" square; widths to 16";
width to thickness ratio not
exceeding 10:1

*Cross sectional areas up to
200" square widths to 16";
width to thickness ratio not
exceeding 10:1

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to us.

WE do this—

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and delivery date. Samples on re-
quest. Name offers you a wide vary-
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Headquarters: 1000 N. Michigan Avenue, Chicago, Illinois.
Los Angeles: 1000 Wilshire Boulevard, Los Angeles, California.
Milwaukee: 1000 North 10th Street, Milwaukee, Wisconsin.



DOORSAKET LTD. aircraft plane of Gnat turbines in Concorde aircraft aircraft for most likely outlet out, now abandoned by manufacturer and user alike. White path on upper surface a location of life.

body. Only, the completion is some months away.

Maintenance of the Concorde, said one engineer, has not required any special tools, which would be most problematic. He added that for this reason, the Concorde design would look just like any other maintenance lump.

These were two contrasting judgments in the shop. The first was that there seemed to be no lack of accessibility to the engine compartment with its "blown" Gnat engines, although this is a favorite argument of the pad proponents. With the plane in a static position, it was possible to reach the lower portion of the engine. A low sheet metal fairing made accessibly easy up to the engine cartridge.

The second judgment: All stressed markings on the Concorde were in English, on the Air France Lockheed Super Constellation, all such markings are in French.

Engines (markings in English), overhead is currently down at 490 lb. each, and is to be increased soon to the 600 lb. level. Current practice is to send engines back to the DHL factory for overhaul. In the same future, overhead of the Concorde engines will take place at Air France's engine shop at Courbevoie near Paris.

► Flight Testing—Concorde crews began their training in December 1972 with a program about three times as involved

as that required to train a Concorde or DC-10 pilot for operation.

The crew has made familiarization trips over 200,000 miles with the British airline, and had received instruction in England. Part of this program was a complete seven-week ground school course at the DHL factory, and two months of flight training under the tutelage of DHL pilots. Maintenance mode operations and navigation were going through the BOAC ground school.

After the first two tests had been through the "British" phases of their program, they switched to start of the other phases on a comprehensive program of flight tests.

The training includes about 10 to 12 hours of local flights, during which the pilots get the feel of the airplane under various conditions of aerodynamic configuration and power. After this, they fly the Concorde over various routes for night training to come up to approach procedures, use of radio and navigational aids, and integrated crew work.

► Handling Characteristics—According to Capt. André Gérard and René Timmerman, chief and senior chief pilots for Air France's Concorde unit, the Concorde has no unique characteristics at all. There is plenty of stability warning before the airplane drops out into a profile, easily controlled with no tendency to fall off on a wing.

The airplane has a tendency to pitch

ESCAPE



Here is a record of performance no other type of parachute has ever delivered.

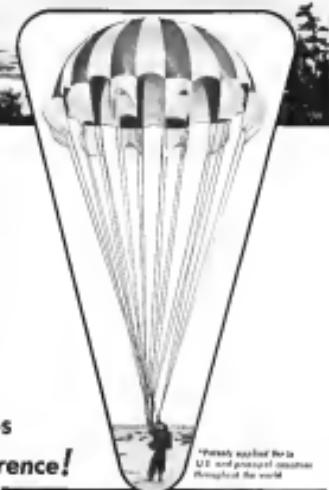
An ejection seat with a 400 pound load equipped with a Pioneer P-7B parachute was catapulted from a jet plane flying at a speed of 400 miles per hour at a 200 foot altitude. The parachute was fully opened and it descended at a rate of descent 150 feet above the ground.

This is but one of hundreds of tests, under the most difficult circumstances, which have proved the performance superiority of the new PIONEER GUIDE SURFACE PERSONNEL PARACHUTES.

The new **P-7B** **P-9B**

Pioneer Parachutes

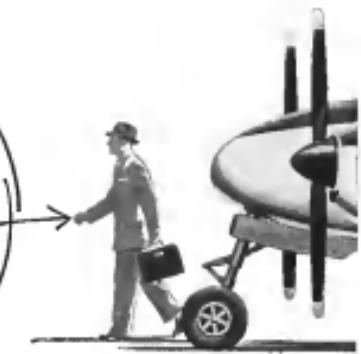
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To the
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A spark plug, too, is known by the company it keeps!

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- Every major domestic scheduled airline.
- A majority of overseas airlines.
- A very high percentage of our military aircraft.
- So many quality-conscious owners and pilots in private and corporate aviation, that Champion is the most popular aircraft spark plug on the market—year after year.

It is this tremendous popularity, and the great production volume that it permits, that enable Champion to maintain extremely low prices on top quality spark plugs.

It is a safe conclusion that once you have flown with Champion you will never again be completely satisfied with any other spark plug.

CHAMPION SPARK PLUG COMPANY, TOLEDO 1, OHIO



up near its critical Mach number, and the pilots fly closely enough to their wake vortices that some of them are also approaching the transonic Mach numbers of 0.77 in climb, and 0.82 in descent, as shown during the program.

► **Coldfront**—Duties of the Council—or of jet transports in general—have aided three specific complaints:

► Takeoff procedure becomes a critical problem too easily.

► Landing on a wet or very muddy field is difficult because of the lack of runway length.

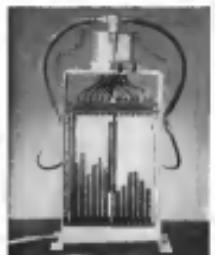
► The lack of "feel" transmitted to the pilot through the control column during flight is believed to be:

► **Assume**—Chances are that the reader gives these answers to the three points.

► Part of the training program for Comet crews—British and French—includes simulated "off-field" takeoffs to instill the pilots. At French training also includes a stalled takeoff, the airplane is pulled to a stalled attitude as soon as possible during the takeoff run. That is held only long enough to stabilize the aircraft, then is given to the new pilot that he does not take off under such a condition.

Chaussé stated that it takes a lot of strength to pull the stick off the very hard and hold it back during a takeoff. This "stall-warning" consideration was an excellent reminder, he believed.

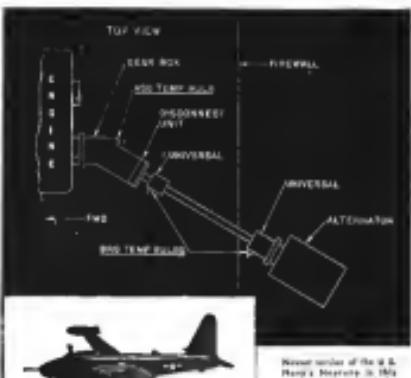
In addition to this training procedure, takeoff calculations have been made for every runway on the Comet route for all conceivable conditions of wind, weather and weight. These calculations have been worked out in chart form and



Designed to measure nozzle spray dispersion at jet and dead cones, this portable device operates by directing and observing sprayed water into a test cone to measure dispersion and atomization checks. Nozzle is placed in glass cage at top and attached to flow source. Called the Pneumotest, unit is manufactured by Jettest, Inc., Englewood, N. J.

Lockheed Neptune Gets New

Temperature Warning System



Bottom version of the U.S. Neptune. The "THERMAL" PTV is mounted inside the nose and is held in by two hydraulic servos. The servo is also driven by the servo system used by the three other systems.

A NEW NEPTUNE Temperature Alarm System keeps jet sensitive "igniter" on those spots in the alternator drive system. Should the temperature stay or still spot rise to 150°C, an alarm automatically signals in the flight compartment. The alarm drive system is so designed that it can be immediately disengaged before serious damage can happen.

THE SYSTEM can be adapted to any number of engines and still remain in basic simplicity. For information concerning specific applications, write to—



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Page 46, West Orange, New Jersey



A trained ground crew monitors the F4D flight by recording four individual passes over a three-kilometer course.



Official representatives check the distance of individual passes to determine average speed attained by the Douglas F4D.



LCDR James R. Virdin waves after piloting the Westinghouse-powered F4D to record-shattering runs of 761.675, 761.414, 766.655 and 759.409 mph.



Westinghouse J40 powers F4D to world speed record

U.S. Navy establishes mark of 753.4 mph

A Westinghouse J40 turbojet powered the Douglas F4D "Skymar" to a new high speed of 761.414 mph as it recaptured the world speed record for the United States by streaking to an official average of 753.4 mph over the required course.

Designed and manufactured by the Westinghouse Aviation Gas Turbine Division in South Philadelphia, Pa., the J40 and other outstanding turbojets now are being produced at the huge Westinghouse jet engine plant in Kansas City, Mo.

This J40 contribution to record-breaking jet progress is another example of Westinghouse turbojet leadership. Westinghouse Electric Corporation, Aviation Gas Turbine Division, Lester Branch P. O., Philadelphia 13, Pa.

J-4012

YOU CAN BE SURE...IF IT'S
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GLIDE TESTS of Lodestar by Lear, Inc., evaluate modifications made to replace one engine in service drop. Cruising speed has been boosted from 250 to 300 mph. Fuel cost is present as fuel consumption by application of analytical method to glide test data.

Tests Help Boost Lodestar Speed

The engineering technique that helped set a world's distance record for subsonic flight boosted the cruising speed of a special Lockheed-built, Lear-modified Lodestar to 300 mph.

These results and data on power and power of flight have been analyzed in a technique originally developed for supersonic research by Dr. Alexander Raport, head of the Aerodynamics Dept. at Mississippi State College. The results of such flight tests indicate prospective areas for investigation of drag reduction.

Using the technique, Raport—who has been retained by Lear, Inc., to guide the performance phase of Lodestar modifications—has upped the Lear executive craft's cruise speed from 250 to 300 mph, at no cost in fuel, or power.

This program is the first application of Raport's method to powered aircraft. In earlier work with the B-17 bomber, the glide ratio was improved from a value of 30 to a value of 40. R. H. Johnson, who developed the method at Mississippi State, and the craft is at its final form to set a world's distance record of 535 miles.

Drag and the analysis.—The basis of the new method is to use the craft as a windtunnel. Raport says that even if full-scale wind-tunnel tests could be performed on the Lodestar—and they couldn't because there isn't any tunnel large enough—such tests would be of doubtful value because of differences and tunnel wall effects. Furthermore, the cost would be very large.

Flight tests were the alternate approach. Since there's a lack of general windtunnels with propulsors removed and built into them at 18,000 ft., seeking speed measurements were made in the glide after release, and from these data overall propulsive efficiencies were computed.

Aircraft now in the second largest

Los Angeles—Imports of the aircraft industry in the nation's economy is spelled out in detail in a survey by Aerodata Institute, Inc.

In Los Angeles, center of the industry, was chosen for the association's survey. Aerodata says the second largest

manufacturing industry in the U. S. Aircraft and parts form the largest manufacturing industry in the Los Angeles metropolitan area and the entire state of California, the survey shows.

► **570-Million.** Payroll—In September 1953, nearly 162,000 persons were employed in six companies—Douglas, Hughes, Lockheed, North American, Northrop and Allis-Chalmers. With total manufacturing employment in the area at 647,000, this meant one of every four was working in aircraft and aircraft parts manufacture.

The AIA survey reports the six companies produced equipment for more than 200 aircraft in Los Angeles than the next three ranking aviation centers.

► **What the aircraft payroll of 570 million a year means to the community** was estimated by AIA. The total payroll of nearly \$5 million a day was spent at a rate of \$3.2 million a week for government, industry, \$1.2 million for manufacturers, dealers and service, \$1.3 million for aircraft, \$1.2 million unclassified, \$1.2 million for aircraft service, business, advertising, business, \$833,000 for fertilizer and household appliances, \$633,000 for lumber and building materials, \$350,000 for entertainment and \$100,000 for down and outdoor.

► **476-Million Spending.**—This amount spent by aircraft and allied industries, says AIA, would support more than 6,000 retail stores, 8,000 doctors, dentists and dentists, nearly 2,000 service stations, thousands of food markets, restaurants, service stations, drug, general, discount and hardware stores.

More than 13,000 teachers were required to educate the children of aircraft industry employees.

The six firms surveyed are spending \$476 million annually with local merchants and subcontractors for materials and services ranging from paper clips to complex scientific equipment.

► **Concentrated.**—Comparatively speaking, the six companies is more than \$5.5 billion—only 10 percent of the total manufacturing capacity on deposit at metropolitan area banks. The amount they pay in local taxes is more than \$13 million annually, AIA says.

Consolidated sales for aircraft and aircraft parts during fiscal 1953 amounted to almost \$1.7 billion, more than the combined total of agriculture, petroleum, citrus and construction.

Stacking up these impressive statistics, AIA concludes:

"In the metropolitan area is located one of the most concentrated groupings of aircraft industry anywhere in the world. This concentration has given rise to an efficient but isolated state in Los Angeles as the air capital of the world."

Flexibility in manufacturing to meet rigid schedules

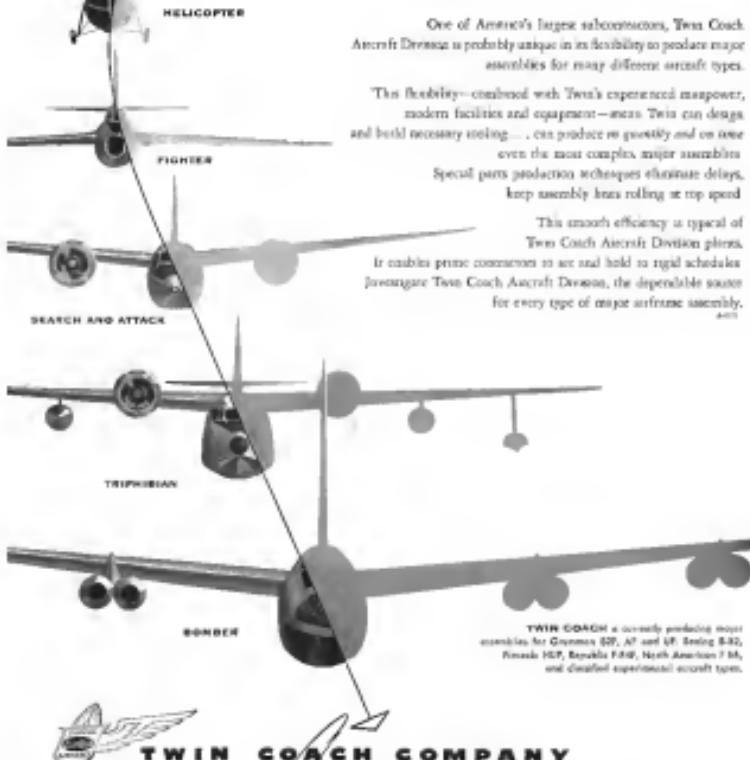
One of America's largest subcontractors, Twin Coach Aircraft Division is probably unique in its flexibility to produce major assemblies for many different aircraft types.

This flexibility—combined with Twin's experienced manpower, modern facilities and equipment—means Twin can design and build necessary tooling... can produce in quantity and on time even the most complex major assemblies.

Special parts production schedules eliminate delays, keep assembly lines rolling at top speed.

This smooth efficiency is typical of Twin Coach Aircraft Division plants.

It enables prime contractors to set and hold to rigid schedules. Investigate Twin Coach Aircraft Division, the dependable source for every type of major airframe assembly. *ADS*



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FINANCIAL

1953 Market Action Of Airline Common Stocks

Company	1952 Close	1953 Range		1953 Close	Percent of Increase From 1952 Close	
		Highest	Lowest		Amount	Percent
American	\$61.75	\$61.25	\$51.30	\$61.00	\$1.00	1.6%
Brussels	21.50	21.50	17.50	21.00	\$0.50	2.3%
Capital	11.50	11.50	9.50	9.50	\$0.00	0.0%
Continental	12.00	14.25	10.75	12.00	\$1.00	8.3%
Continental (TVA)	7.50	8.75	6.50	7.50	\$0.25	3.3%
Delta-CAL	10.75	14.50	10.50	10.50	\$0.00	0.0%
Eastern	10.00	10.25	9.00	10.00	\$0.00	0.0%
Eastern (TVA)	10.75	12.25	9.75	10.75	\$0.00	0.0%
Midwest	10.75	12.25	9.75	10.75	\$0.00	0.0%
Northwest	12.00	14.50	10.50	12.00	\$0.00	0.0%
Pan American	14.00	14.25	12.50	14.00	\$0.00	0.0%
TWA	10.75	10.75	9.50	10.75	\$0.00	0.0%
Total	\$61.00	\$61.50	\$51.00	\$61.25	\$0.25	0.4%
Western	10.75	10.75	9.75	10.75	\$0.00	0.0%

AFTERSHOCKS (continued)

Why Have Airline Stocks Dropped?

Here are some of the reasons investors are playing hard-to-get, even though earnings approach new peak.

Despite favorable safety earnings last year, continuing well into 1953, capital of the group have experienced declining market valuations.

The explosive AVIATION WEEK compilation above of the market action of major airline common stocks supports these statements.

The general market, as measured by a popular composite stock index, is now down an average 10% from the 1952 peak. Major airline stocks are down an average of the very first 23.1% to as little as 5.7%. (By contrast, the stocks of a number of smaller manufacturers showed a marked increase in the same period. See AVIATION WEEK Oct. 29, p. 49.)

Low Point—Airline shares are now at their lowest levels in some three years. This condition prevails despite the industry's all-time record earnings of 1952 which, as the average, were 10% up.

Only Colonial Airlines displays any increase in market price for this year. The gain, 5.9%, is due entirely to the company's pending acquisition by Eastern, recommended by a CAR reviewer and now subject to White House approval.

Continental Airlines shows the smallest

percentage decline of the group, beginning off only 1.3% from the 1952 year-end. A relatively limited market among the aviation industry has evidently had a tendency to minimize price fluctuations in this issue.

The greatest decline (31.1%) has been experienced by the common stock of Braniff Airways. The company has sustained heavy losses in its Latin American operations, which may be forced to adjustments as cost rate restructure continues. The situation at Mid-Continent has also been a factor in contributing to Braniff's losses.

While having the lowest and market price, Northwest's common stock shows a relatively modest loss of 23.3% during the year. Despite an excellent management, operations second, NWA has not been able to increase the public's spirit to benefit substantially.

Among the Big Four, Eastern shows the best resilience in the decline, being down only 13.5%. The company's low earnings record and, particularly, its known conservative accounting policies may have contributed to this.

►No Precision—One of the most significant developments in recent market price trends of the industry is the synthesis of most truck air carrier equipment elements in their respective book

PILOT PROTECTION AGAINST "G" FORCES

Aviation's "Anti-G" Valve helps prevent unconsciousness in emergency protection of personnel.

This valve links the pilot's "Anti-G" harness to a source of compressed air. Any sudden change in "G" force (gravity or centrifugal force caused by turns, dives or climbs) opens the valve. Air released vented due to existing flight conditions is admitted to the "G" valve bladder, creating pressure on the legs, thighs and front abdomen. This pressure prevents the pilot's blood from rapidly draining from his head down into his body thus preventing "blackout".

For further details on this "Anti-G" valve and other high-precision aircraft products produced by Aro write:

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"ANTI-G" VALVE
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31 YEARS OF RYAN PIONEERING MAKE U.S. PLANES FLY FASTER, FARTHER, LONGER

Few people realize that today's great aerospace racing history at Ryan's modern San Diego factory grew from a 20 by 60-foot shop that housed Ryan in the early 1930's.

The almost incredible growth of the Ryan organization, and the important role it has played in helping to create a great new industry for 31 of the 50 years since the Wright Brothers first flew, exemplifies the success possible under America's system of free enterprise.

Conveniently a leader in aeronautical progress, Ryan continues to offer the military services and to commercial aviation products of distin-



RYAN FLYING COMPANY, 1938



RYAN P-47 FIREHAWK, 1944



RYAN FACTORY AND HOME OFFICE TODAY

cuted quality and performance. This ability plus Ryan's renowned management vision, enthusiasm, ingenuity, perseverance, and thrift have been responsible for the company's steady, healthy growth.

Today, Ryan's plant covers three-quarters of a million square feet of production area and 40 acres, and is staffed by more than 4,500 skilled organizational workers whose spirit and loyalty is extraordinary. It is this combination of skill, modern equipment and enthusiasm, matched with Ryan's remarkable aviation experience that gives Ryan the edge in solving today's aircraft problems.



Described as progressive and versatile, Ryan is still continuing its "first" for U.S. planes to continue to help build an even more "modernized" air age in the years to come.

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values. In past years most franchises equated sales to the market at substantially greater rates than actual.

Only American aircraft equity, with a current book value estimated at around \$8.00 per share, commands a noteworthy market premium. The high degree of leverage inherent in the company's organization, together with a sustained earnings record, probably accounts for this condition. Eastern's common stock is currently estimated to have a book value representing present market quotations.

For American's equity, with a book value of \$16.07 at the 29/32 year-end, shows the greatest divergence from current market value, about 40%.

► **Solomon's Effect**—These disparities illustrate the continuing influence that earnings and the potential profit or lack of each company has in determining the course of market prices. The history and quality of earnings also come in for crucial evaluations. In other words, earnings subject to sudden fluctuations are not always regarded as fully dependable. Further, while capital gains realized in the sale of property may bolster stock market position, they are not given the same high regard, which is natural enough from normal operations.

Nevertheless, airline equities of the major commercial carriers fell to low multiples of anticipated earnings for 1953. Further, of the leading carriers, one fell at least 30% from the five to six times projected 1953 earnings. Historically, this is about the lowest that earnings have ever been evaluated for the airlines.

► **Other Factors**—But it is not difficult to find the basis for this relatively low valuation. Shifting governmental policies continue to create and give rise to many doubts as to stability in the industry. The highly marginal aspects of operation where rising costs and lower-cash flow requirements pose a threat to carriers, and the difficulty of attracting potential new equity.

The need for forthcoming financial resources to support continually growing facilities has made for limited dividend distributions. This is not viewed favorably by many would be investors.

All of these elements and the usual questions for airline equities in themselves clearly indicate that a decidedly speculative tone will underlie the air transport industry. The one healthy factor remains in the strong growth aspects of the industry, which promises to renew some peaks in traffic and earnings.

But all this has to be measured very carefully and dependable earnings before income equities may be regarded as qualify investment vehicles.

—Selig Abrahams

Eclipse-Pioneer

CORROSION-RESISTANT AUTOSYN® SYNCHROS

(A-700 Series)

TYPICAL MECHANICAL CHARACTERISTICS

Parameter	Value	Parameter	Value	Parameter	Value	Parameter	Value	Parameter	Value
Temperature	40°F to 140°F (-40°C to 60°C)	Shaft Diameter	1/2 in.	Shaft Length	1/2 in.	Shaft Torque	10 in. lbs.	Shaft Speed	1000 rpm
Mounting	Frontal	Angle Change	±10°	Shaft Material	Stainless Steel	Shaft Weight	1.5 oz.	Shaft Finish	120 grit
Shaft Material	Stainless Steel	Shaft Weight	1.5 oz.	Shaft Finish	120 grit	Shaft Torque	10 in. lbs.	Shaft Speed	1000 rpm
Shaft Torque	10 in. lbs.	Shaft Weight	1.5 oz.	Shaft Finish	120 grit	Shaft Torque	10 in. lbs.	Shaft Speed	1000 rpm
Shaft Speed	1000 rpm	Shaft Weight	1.5 oz.	Shaft Finish	120 grit	Shaft Torque	10 in. lbs.	Shaft Speed	1000 rpm
Shaft Finish	120 grit	Shaft Weight	1.5 oz.	Shaft Finish	120 grit	Shaft Torque	10 in. lbs.	Shaft Speed	1000 rpm

PYGMY AUTOSYN SYNCHROS

(A-500 Series)

TYPICAL MECHANICAL CHARACTERISTICS

Parameter	Value	Parameter	Value	Parameter	Value	Parameter	Value	Parameter	Value
Temperature	40°F to 140°F (-40°C to 60°C)	Shaft Diameter	1/2 in.	Shaft Length	1/2 in.	Shaft Torque	10 in. lbs.	Shaft Speed	1000 rpm
Mounting	Frontal	Angle Change	±10°	Shaft Material	Stainless Steel	Shaft Weight	1.5 oz.	Shaft Finish	120 grit
Shaft Material	Stainless Steel	Shaft Weight	1.5 oz.	Shaft Finish	120 grit	Shaft Torque	10 in. lbs.	Shaft Speed	1000 rpm
Shaft Torque	10 in. lbs.	Shaft Weight	1.5 oz.	Shaft Finish	120 grit	Shaft Torque	10 in. lbs.	Shaft Speed	1000 rpm
Shaft Speed	1000 rpm	Shaft Weight	1.5 oz.	Shaft Finish	120 grit	Shaft Torque	10 in. lbs.	Shaft Speed	1000 rpm
Shaft Finish	120 grit	Shaft Weight	1.5 oz.	Shaft Finish	120 grit	Shaft Torque	10 in. lbs.	Shaft Speed	1000 rpm

Available for all applications is the new, corrosion-resistant AY-200 Series of Eclipse-Pioneer Autrosyn Synchros (A-700 Series). Where space and weight are prime considerations, Eclipse-Pioneer offers the AY-500 Pygmy Autrosyn Synchros Series (A-500 Series, 1 in. x 1.775" lg.) with corrosion-resistant models available in sample quantities. Whatever your synchro requirements may be, our long experience, modern facilities and advanced production techniques can work to your advantage. For full details, write Department IL.

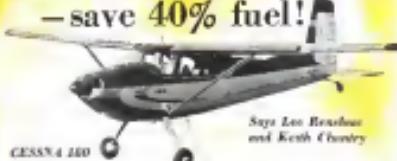
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SCOTT AVIATION CORP.

WHAT'S NEW

Telling the Market

General aviation and aircraft information publications made by Aircraft Mfg. Co., Inc. are distributed in booklet FBI-311 being distributed by the firm Winter Aircraft Co., Los Angeles, Calif. . . Mississippian aircraft manufacturers for aircraft are described for engineers in Catalog 400 issued by Ticheli, Inc., P. O. Box 59, North Wales, Pa. . . Filters for oil, fuel, hydraulic fluids, gas and air used in aviation applications are covered in 32-page booklet available from Pneumatic Products, Inc., Roslyn, N. J.

Electronic radiation heating generators are described and other conditions of applications are given in a booklet being made available by Radiation Heating Corp., 110 W. 47th Street, New York 18, N. Y. . . Quick-quench aluminum heat-treat furnace, featuring forced circulation of natural gas flame to quench, is detailed in brochure available from James H. Knipp Co., 1735 Wiskem St., Los Angeles 31, Calif.

Refueling systems for jet aircraft are covered in a booklet describing applications in refueling, cabin conditioning, auxiliary power units and other uses. Westar Solar Aircraft Co., 2200 Pacific Highway, San Diego 12, Calif. . . Liquid oxygen breathing equipment for transcontinental flight. Fiber-Glas is described in a booklet being distributed by the Libby-Owens-Ford Glass Co., Dept. 3, Wayne Building, Toledo 3, Ohio.

Aircraft rolling facilities of Twin Mfg. Co. are pictured in a booklet available from the firm. Write in care of the Aircraft Rolling Division, 40-07 11th St., Long Island City 1, N. Y. . . A bibliography of new literature, chapters of 1954, is issued by 750-Junc. 1955, with author index, having chronologically 452 U. S. and foreign articles, treatises, pamphlets and books. West International Nickel Co., Inc., Elkhorn, Massachusetts, Litchfield, Conn., New York 5, N. Y.

More than 750 precision, standard dry-break bases available from standard tooling are covered in the 1954 catalog available from Zoro Mfg. Co., 3121 Chestnut St., Burlingame, Calif. . . Facilities for producing quality rubber products using synthetic and天然 rubber compounds are described in a booklet booklet being made by Custer Rubber Co., Inc., Custer, Ind. . . Ultrasonic cleaning is covered in a booklet CEA-605 available from

General Electric Co. The firm is also making available three other bulletin, CER-599, CEA-602 and CEC-599 on the recently developed Filoflex extrametallic-electrode gas-shielded welding process. Write GE at Schenectady 5, N. Y. The firm's Catalogue Dept., Detroit 12, Mich., has issued Bulletin WR-807 dealing with use of concentrated carbides in wire-grounding equipment

Shock-proof flying ballasts designed for areas of high-speed aircraft are described and illustrated in a booklet being distributed by General Electric Mfg. Inc., 478 Seventh Ave., New York 1.

N. Y. Structural features for aircraft and other specialized heavy-duty applications are detailed in a series of technical data sheets grouped in a loose leaf type folder. Write Simmonds Aerocoustics, Inc., Troyhollow, N. Y.

Cutting-off, sandblasting and abrasive cut-off wheels, their selection, application and proper usage, also helpful tables for cutting tools and conversion tables which needs to find part numbers when are all covered in booklet being issued by Norton Co., Worcester, Mass.

Spindle that enables operators of banding tools to change tools in less than 10 seconds is described in folder

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of 300 to 1 is common to all modern flight simulators. But for reproducing the extremes of supersonic flight the men who design and engineer Link Flight Simulators go further. A ten-fold increase in accuracy is built into Link's analog computer systems - which employ an electro-mechanical integrator with a 3000 to 1 speed range. And it really pays off! For example:

In order to produce realistic simulation for high speed flight, rates of descent as high as 20,000 feet per minute must be accurately computed. The conventional integrator integrating range of 300 to 1 cannot accomplish this without sacrificing accuracy at the slower speeds, e.g., rates of descent less than 100 feet per minute. In Link's newest jet simulators, however, changes of altitude are computed over an integrating range of 3000 to 1, and thus accuracy is maintained throughout the complete range of rates 30,000 feet to as low as 10 feet per minute!

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available from Fender Machine Tool Co., Cincinnati 23, Ohio. Router bit of stock gear, speed reducers, spindles and shafts and speed gears is contained in speed-based cutting tool able from Great Gear Works, Inc., 154 West Second St., Boston 21, Mass.

Ground power units for aircraft, including sizes for 25-55 kw. d.c., are described in folder MGC-102 available from Motor Generator Corp., Herbert Brothers Affiliates, Inc., 1600 Chever Road, Elkhart, Indiana. The catalog lists catalog numbers, descriptions, ratings, and operating instructions for each model. For application, Write Technical Co., New Brighton, Pennsylvania. Electric clutch control for power machines is described and described in Catalog 59 being issued by Melpa Division of Minneapolis-Honeywell Regulator Co., Minneapolis.

Window sashes, made of high tensile steel strands and wires, with a steel core of 250-psi tensile strength, are described in quad-bound booklet sample of the product is offered to handset. West Rutherford Paper, Inc., College, N.J. An aluminum extrusion, Model MS-801 for mounting window frames of panels and other materials and for insuring internal defects is described in Bulletin 1810 available from J. W. Dier Co., Englewood, N.J.

Magneplane Plate and Sheet to Reduce Weight is title of folder giving dimensions, thicknesses and other data on different grades of products offered by Brooks & Pavlin, Inc., Detroit 16, Mich. Hydro-Coupling flexible gears for use with all types of stretch forming production equipment are covered in folder available from Bradford Machine Works, Inc., 1700 E Grand Ave., El Segundo, Calif.

Publications Received

- The Flying Teacher-Learner Bookmarks, by G. P. Putnam's Sons, New York, N.Y.-\$1.25. A pictorial history of man's conquest of the air.
- Aviation Dynamics—Gyroscopic Control, by Edward D. Goss, Jr., Avco Corp., Waltham, Mass. How to serve in an airplane design team a delicate art of specification.
- Torsoform's Air Agency Bulletin, Also address pub. by Racine & Company, Inc., 222 Madison Ave., New York, N.Y.-\$1.00. A popular presentation of air prediction related to the Air Age. This article considers the human and technical factors of the application of aircraft.
- Design for Dynamics—by Leon D. Ternow, published by The Macmillan Co., 630 Fifth Ave., New York 11, N.Y.-\$4.75. The Department of Aerospace Engineering, Cornell University's Medical College, has attempted to reduce modern statistics and the method of states of decision making for the human and the research pilot.

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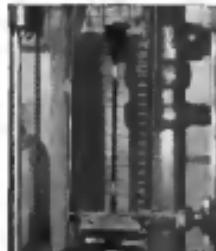
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47

PRODUCTION



MODIFIED BOEING C-97

with redesigned interior for carrying patients, prisoners or cargo, lever Temeo Aircraft Corp. in Greenville, Tenn., converted earlier when Temeo is retrofitting a number of Stratofighters for Military Air Transport Service. Interior width is not any greater than less than two hours.

Temeo Turns Out 'Triple-Threat' C-97s



BEFORE modification, Boeing Stratofighters interior looked like this. Note prop. side collapsed against cabin walls. Fixtures for later were cumbersome.



AFTER modification by Temeo, new cabin has 60 available seats, shown folded to permit cargo storage. Walkable flights along rear flight deck.



MIXED LOADS of patients and passengers may be flown using this layout. Cargo can be performed for priority. Alternatively 60 passengers or 54 litter cases can be carried in the modified Stratofighters.



INSPECTION of revised C-97 interior is made by NETS Lt. Col. Joseph Smith (foreground). In white shirt is D. L. Hamm, who headed Temeo Stratofighter conversion team.

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Warner's Extension Power Brake Valve, shown above, has an exclusive hydraulic feed-back feature to give the pilot immediate warning in event of hydraulic system failure. This unique, lightweight, space-saving valve is inexpensive to a wide range of system and brake pressures.

Warner is qualified by experience and facilities for the design and production of critical hydraulic equipment for a wide range of uses. Warner engineers will welcome an opportunity to assist you in the development of special hydraulic equipment to meet your particular requirements.

Write for your copy of the illustrated folder shown above describing typical examples of Warner precision hydraulic equipment.

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MAGNESIUM pot is lowered into furnace for Resin Impregnator.

Resin Impregnator Cuts Porosity Rejects

Magnesium gas-hog casting for A. V. Roe Canada, Ltd., a Canadian aircraft, are being impregnated with Penrite 1251 to eliminate rejects showing porosity.

The process was originated by York Gage Ltd., Toronto, under subcontract from A.V.R. The vacuum impregnating equipment is made by F. J. Stiles Machine Co., Philadelphia.

The Penrite, a synthetic thermosetting resin, is a General Electric Co. product, supplied in Canada by Canadian General Electric Co. Ltd.

Castings are delivered to the impregnating operation directly from the foundry by removal of bats. Usually they are only dry green when in the porosity testing. When required, cleaning is done in a 50-50 mix through a vapor type degasser.

The castings, coming as so, are loaded individually into the Stiles vacuum impregnating chamber. From 15 to 120 parts may be treated in a single batch. Vacuum is held for 60 hours to remove air from the casting pores. Penrite is then drawn into the tank until the casting is coated, and the vacuum is maintained for another half hour. Air is introduced into the tank to speed up the impregnation process. Once Penrite is retained to the surfaces when the air pressure is reduced to 5 psi.

Castings are then cleaned in a bath with water and mild detergent solution at 170°. The surfaces are then



Can you see the BIG difference?

On the face of it, Avien's Two-Unit Fuel Gage looks like previous systems, but there's a big and important difference behind it all.

Behind this Avien dual-line gage (shown here three times actual size) is Avien's brand-new concept of fuel gage system "packaging."

Previously, you'd had three units behind a dash: an indicator, a sensor and balancing potentiometer, and electronics + bridge amplifier, a shockmount and a tank unit.

Now, in the Avien Two-Unit Gage, the necessary components for the bridge and amplifier functions have been built right into the indicator case.

The result: a fuel gage system of "plug-in, plug-out" simplicity, which weighs 50% less and eliminates the need for any field calibration.

What a BIG difference this makes in money!

First of all, the basic system costs less. Less time is spent in installation. Less wiring and connectors are needed. Less maintenance is required, because there are fewer components to maintain. Troubleshooting time is cut for the same reason. And fewer parts must be stocked for maintenance and repairs.

Because of this new package, Avien gages are now "shelf items." They're completely interchangeable in the aircraft for which they are designed.

Additional features for fuel management can be easily integrated into the basic Two-Unit system.

The Avien Two-Unit Fuel Gage is now available to most production programs. The indicator is available in either large or small sizes, with all varieties of dash configurations.

Every month, Avien produces over ten thousand major instrument components for the aviation industry.

The Avien Two-Unit Fuel Gage will make such a BIG difference in your cost sheet, we suggest that you write or call for more information today.



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design where inches
and ounces count...



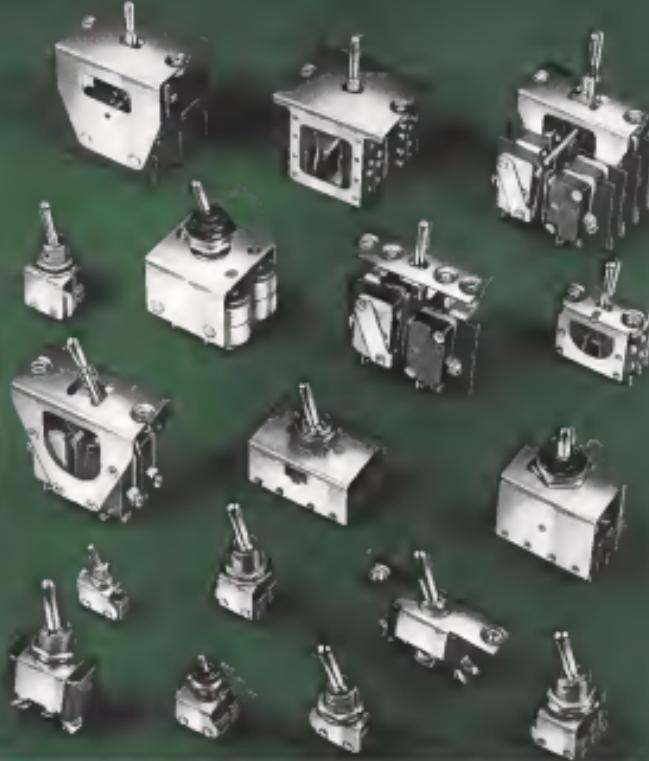
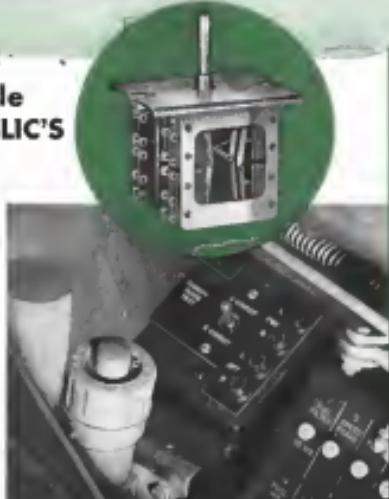
* Republic Aviation's F-84F Thunderstreak jet fighter which depends on MICRO toggle switches for important electrical controls.

Provide accurate multiple circuit controls in REPUBLIC'S F-84F Thunderstreak

Control of important electrical circuits in the new REPUBLIC F-84F Thunderstreak jet fighter is the function of MICRO's SAT16 Toggle Switch... an assembly of 16 subminiature switches operated by a single bat handle.

The MICRO subminiature switches used in this assembly are less than $\frac{3}{8}$ " long and weigh less than 1/15 of an ounce. The assembly provides an unusually efficient, compact and lightweight assembly for the control of sixteen circuits. Eight of the switches operate with each direction of the toggle motion.

At the right is shown the MICRO toggle switch assembly before and after installation in the cockpit of the Thunderstreak.



There are seventeen different types of MICRO toggle switches developed to meet the most exacting requirements of aircraft design engineers. Whether design calls for a toggle switch (a) horizontally tilted for maximum repeat altitude or environmental changes, or (b) with sealed toggle lever, or (c) extremely small to fit in close quarters, or

(d) assemblies for switching multiple units... MICRO has the switch assembly to best fit your needs.

MICRO engineers are specialists in solving difficult aircraft switch design problems. Their assistance is available to you. Contact the nearest MICRO branch office for full information or engineering cooperation.

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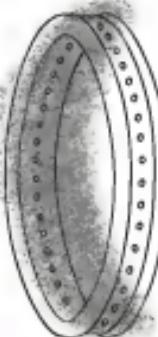
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PRODUCTION BRIEFING

► **Hiller Helicopter**, Palo Alto, Calif., has sold 500K copies off its assembly line. The firm flew its first rotary wing aircraft in spring of 1944.

► **Nugay Aircraft Division**, Muskegon Heights, Mich., has been awarded two contracts for manufacture of major air frame assemblies by Fisher Body Division of General Motors and Republic Aviation Corp.

► **American Helicopter** Co.'s wholly owned subsidiary, Platner Research, Inc., has purchased the assets of Platner Engineering Corp., Costa Mesa, Calif.

► **General Electric** Co.'s X-Ray Dept., Milwaukee, Wis., has received a nearly 100% increase in its original contract for serial reconnaissance aircraft. Total awards now stand at approximately \$4 million. More than 35% of the parts are being subcontracted, with more than 80% of the subcontractors classified as "small business."

► **Precision Gear & Products**, Paterson, N.J., has received a \$1,751,000 contract to manufacture 500 accuracy gear assemblies for the Wright J65 Sapphire turboprop. The gear supplier is attempting to build a new 10,000 sq ft heat treating plant adjacent to its 24,000 sq ft present factory.

Lebanon Steel Foundry, the largest producer of centrifugal castings for jet engines, is proud to have collaborated with the Wright Aeronautical Division, Curtiss-Wright Corporation, in developing this unusual investment casting. Inconspicuous features inherent to our and our associate's licensees, requiring no machining. Of special high-strength alloy steel, this part is quite large in size and is designed to operate satisfactorily under high temperature conditions in one of Wright's newly designed jet engines.

Lebanon Steel Foundry supplies castings to Wright for the J65 (Sapphire) turboprop engine, which is now in production, and is producing experimental parts for the company's other advanced jet power plants.



RADIO MOCK-UP FOR CONNIES

Recent issuance of contributions to test configuration at Lockheed Aircraft Corp. for its B-58s, Calif., has called for extensive use of the radio interface mockup, shown being tested and successfully checked in absence of actual aircraft. However, in personnel, holding leading up to date and offering output comparison.



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Leadership in the aviation electronics industry brings us Westinghouse, whose engineers design the first completely automatic electronic assemblies for control systems, and the first rate type electronic integrated employing magnetic amplifiers. In our multi-million-dollar Air Asia Plant, which is wholly company owned, Westinghouse has assembled by flight engineers, gear, then the heat and most complete research and test facilities that money can buy, and located the entire operation adjacent to国籍 International Airport, one of the world's newest and largest airports.

The long list of aircraft equipment products our company designs and produces at国籍 Air Asia has created a staff of outstanding engineers who can meet the challenge of this stimulating new work. The men we send will be in themselves highly competent in their particular area of expertise.

Salaries are open, depending upon training, experience and ability. In addition to a highly requested profit-sharing plan, apprenticeship arrangements and a preferred working atmosphere, Westinghouse offers all the usual employee benefits plus.

STRUCTURAL ENGINEER

LOCATION Special Systems Section of Development Engineering

DUTIES Analysis and design of aeroelastic valves; pictures, structures and aeronautics.

REQUIREMENTS Six or more years experience in aeroelastic design. Engineering degree — BS or MS in Engineering.

SYSTEMS ANALYSIS SPECIALIST

LOCATION Analytical Section of Development Engineering

DUTIES Specialist in operations research. Analysis of aircraft tactical attack problem. Evaluation of detection, acquisition and damage assessment capabilities of aircraft armament systems.

REQUIREMENTS Capable of applying principles of operations research in analysis of aircraft tactical attack problem with or without Ph.D. No previous experience necessary if Ph.D.

RADAR DESIGN CONSULTANT

LOCATION Missile Radar Section of Electronic Engineering Division or Detection Systems Section of Development Engineering Division

DUTIES Consultant and adviser on airborne fire-control radar and missile guidance systems.

REQUIREMENTS Good background in one of the following fields with a broad knowledge of at least one: Antenna Design, Circuit Design, Servomechanisms.

EDUCATION An Electrical Engineering degree. A to 10 years experience in radar or missile field also required.

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IN ITS B-47 STRATOJET MODIFICATION PROGRAM... and, as one acceptance officer for these B-47's was leaving off our Grand Central lines expressed himself, "The B-47 is like paying for an airplane for ten years and having your money answered."

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WHAT'S IN A NAME... QUALITY WORKMANSHIP AND INTEGRITY BUILDS A TRUSTED NAME In planning and development, from the beginning through to the finish, when we were things well done, we seek out those with "Know-how"—the ability to apply experience and skills with intelligence... For the same reasons, the Air Force and Civilian customers specify GRAND CENTRAL AIRCRAFT CO. overheat and modification service, custom built to their specific purposes.

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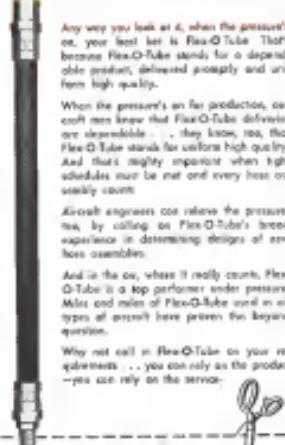
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AVIONICS



AIRLINES ELECTRONIC Engineering Committee of AEEC at Kansas City meeting

AEEC Acts on Avionic Problems

Engineers adopt tentative specs for Selecall system of ground-to-pilot signaling; radar tests studied.

By Philip Klass

Kansas City, Mo.-Selecall, a new system which enables an airline ground station to ring a buzzer in the cockpit of an airplane to which it wants to talk, received a tentative endorsement from the Airlines Electronic Engineering Committee (AEEC) of Aerospace Radio, Inc., which has long strongly advocated mobile pilot calling.

The Selecall system, which is intended to relieve pilot stress of the fatiguing task of continuously monitoring company communications channels, particularly during long flights.

► **Large Airline Operators**—From more than 30 airlines, including British Overseas Airways Corp., Air Force, Scandinavian Airlines System, Trans-Canada and Canadian Pacific Airlines, attended the three day AEEC meeting and the two-day maintenance session which followed.

Total attendance figure of 120 included 100 from the communications-industry as well as the Navy's First Logistic Air Wing, USAF Headquarters, Civil Aerobatics Administration, Federal Communications Commission and the British Embassy.

► **On the Agenda**—Other items, in addition to Selecall, on the AEEC agenda on which the group had reports major took, which included the following:

- United Air Lines radar tests
- New VOR test facility
- New aircraft cooling approach
- Quick-disconnect radio rack drives

use two simultaneously transmittable tones (frequency). The airborne Selecall unit, which contains the regular VHF or VHF/UHF receiver, contains four rotating read elements, each read is assigned to a single, but different, tone.

When a ground station broadcasts the four read displacement pulses (in proper sequence) comprising 90° of angle, the airborne unit, if it has the antenna block, and its four read to flesh a light or ring a buzzer in the cockpit.

A dual-channel airborne Selecall unit, mounted in a short half-NTR case, should weigh about 10 lb and sell for approximately \$500-\$600. A Motorola spokesman told the AEEC: "Motorola is doing a prototype unit."

► **Hundreds of Codes**—The present AAEc spec calls for using 12 tones in the frequency range of 340 to 4,000 cps. This gives 2,970 different possible codes, but only 1,018 of these are recommended for use, mainly because of the possibility of false triggering due to low-power tone and noise interference.

If all 2,970 codes were used, there would be the chance of hearing two at the same moment when only one was being called. Weakly dispersed surface operations make this a somewhat remote possibility, and the consequences are not serious, the committee feels, since "ring up." However, the AEEC decided to use only the 1,018 codes until more are required.

► **More Codes Possible**—By using clear frequency spacing between tones, frequency expansion of the system to 4,910 variable codes is possible, Motorola says. The AEEC will consider adding two new groups of 12 tones in the 300-1,000 cps range.

Since not all aircraft will be equipped with Selecall, and since the number of domestic airways and international air routes now operating in the U.S. totals only 1,450, the committee of AEEC members said that the system has adequate capacity to handle future traffic growth.

After six months of flight tests on its own prototype unit, from San Francisco to Singapore, Pan American is extremely enthusiastic over the new selective calling system. Kenneth Moore, Pan American regional manager, claims 100% penetration through "interference" at distances up to 2,500 miles, and the takeoff trigger.

► **On the use** in two occasions when the ground operators failed to receive the plane on the first call, he immediately tried again and was successful, it was reported.

► **Some Resistance**—Despite Pan Am's enthusiasm, some AEEC members were reluctant to say "This is it." Representation of several airlines felt that inexperienced operators should try out a few equipments to learn rates about \$40



SELECALL enables airline ground stations to flesh a light in the cockpit of an airplane to which they want to talk. It requires only a small electronic unit, like the PAA prototype shown.



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call for operational equipment before AFIC finalized the spec.

AFIC members recognized that the airtank storage for PAA had not given sufficient thought to how they would use SICAF in their operations.

After much consideration, the group agreed to issue the SICAF characteristic as a "tentative" spec as soon as the Army board and other members reached agreement on details. This would allow selected contractors and equipment manufacturers to proceed. Later when actual operational experience has been gained, the spec could be revised if necessary and the tentative qualification will then be removed.

An approved, the characteristic provides for either a single or a dual-chamber airframe unit in which tanks are charged by plugging in new reels, or by means of a reel changing station unit. The latter will require 12 sec until ready, according to each. The dual chamber will permit connection to separate receivers and would be of great interest to operators requiring a means to monitor the PAA fragmentation continuously.

UAL Radar Tests

To evaluate the feasibility of using solid state space warning use, General Air Lines made 35 flights and conducted 173 hours test just under a 100 days equipped with experimental radar equipment. With the support of the Radar Test Cell of UAL and the AFRC, Testell is chairman of the AFRC radar subcommittee. UAL is currently evaluating the test results of test data, including +500 solar slope photos. As a result, Testell declined to express any official conclusions at this time.

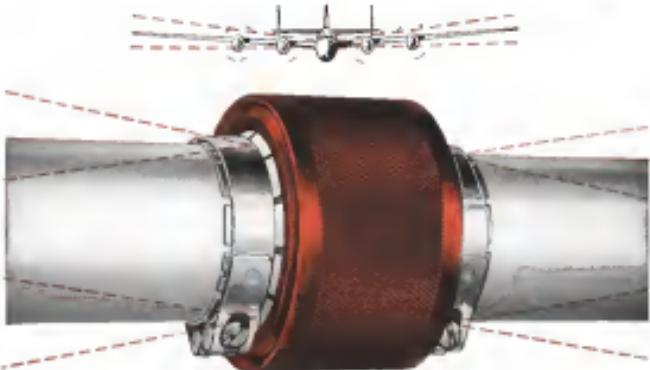
AFRIC members who had been on UAL radar test flights made the following observations:

- Radar stability showed a path through all systems consistent.
- Surprisingly good resolution was obtained at reduced receiver control settings. The 1000-objecion apparently passed to the range of 6.000 radar units that it would not have as good resolution as Testell.
- Beamwidth detection capability of solid space "emitting" range.
- Radar stability not good, with an averaging of the acquisition or detection required during the three months of testing.
- Present CRT display tube is all right for night operations but this tube suffices. In future for interlocking use in a cockpit dimensioned by weight, it can generally agree that a storage type tube is required.

Although several manufacturers (RCA, Raytheon, Hughes, Battelle) have storage tubes under development, these are not yet in production, which

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New York

ved that UAL expects to equip its DC 10s and Convairs with some type of ducted cooling within the next year.

Richard proposed the use of an air intake slot in the lower front panel of the nose, an exhaust slot in the top rear panel, an air intake slot on the right side, low on the AEREC, which would prevent recirculation of air from the aircraft's interior. The new design would also reduce the amount of cooling air required.

► **Quick Diagnostic Station**—Douglas has developed a new type of junction box which makes it possible to remove and replace a radio rack shelf (and associated wiring) in a couple of minutes instead of the eight hours now needed, Richard told the AEREC. The new design replaces conventional removal steps with several small 15-pm crimp contacts.

Altogether, the new design

decreases the weight of the new radio equipment by 15 pounds lighter than present design, Richard said.

DME Tests

After the panel discussion of its proposed specification on distance measuring equipment pending announcement of the results of current negotiations between the Defense Dept. and the CAA to come up with a DME which is compatible with both military and civil needs (Aviation Week Dec. 12, p. 7), the committee did hear reports from airlines which have been testing several of the present civil and military DME units. Major Air Airlines, which has a direct liaison under contract with the Air Navigation Development Board, is currently working out DME-linking procedures with the CAA. Major Air's R. R. Tietler told the AEREC these procedures will be held only during VFR weather until the publication and DME reliability are firmly established.

► **Maintenance Troubles**—Tietler reported considerable trouble initially with the Hirschman type DME units, aggravated by a lack of suitable DME equipment. Although most units operated satisfactorily, the field service and maintenance required for maintenance were often after 100 hours, he said. Major Air is currently maintaining more than 2,000 position checks on DME accurate within 100 feet, however, indicating VFR reliability.

A Pan Am spokesman reported that its Federal type DME unit had failed up to 1,000 flight hours and 150 hours of operation to date, with 14 equip- ment failures during this time, most of

them during the first six months. Pan Am reported several failures in the NASA type DME and Boeing type DME which is currently starting testing.

TWA reported only three cancellations of its Federal DME in 1,800 flight hours, while United had only one failure, but noted that the unit was not used much because low at the route over which the plane operated was equipped with communiated DME ground stations.

William Cannon of Pan Am pointed out that the Federal DMEs under test by TWA, Pan Am, and Capital Airlines are very early models, and that the CAA is up the DME tests to gain operational experience rather than to evaluate the specific airborne equipment.

► **Very Useful**—DME is very good for identifying and extremely useful in ILS approaches," B. R. Redshaw of PAA reported. S. N. White of TWA said that DME was very useful for aircraft identification during a radio approach, enabling the pilot to give his distance from the report in DME station. However, AT&T's Frank White warned that the radio controller must still ask for the airplane to make an identifying turn. Other airline engineers said it was difficult to get pilots to do this, but reports on their DME test observations

New VHF Spec

AEREC officially opposed Characteristics 525-A, in major revision of the previously issued Characteristics 523) which describes an airborne 300-kwatt air-to-VHF communications system transmitter and receiver with 50-kwatt output. The new characteristics are part of a proposal by the Army Board and member airlines before being released.

While the airlines are opposed with the new criteria, the number of communications channels available in the 118.750-120.750 MHz band will be at least doubled. The majority of present airline equipment provides a minimum of 50 channels (250-kwatt spacing).

The new 525-A spec provides for three channels of amplitude of operation, a single-channel 1-watt transmitter and receiver in each frequency.

► **Double-channel simplex** (transmitter 6.0 mc higher frequency than receiver). ► **Double-channel duplex** (permitting simultaneous transmission and reception with 6.0 mc separation in frequencies).

► **Tough Assignment**—AEREC took on a tough job when it decided to write 525-A to include sufficient flexibility to enable the equipment to function with a future Air Traffic Control Sigaling System. The reason is that ATCS system characteristics are still fluid (ATCS is a method of easing the burden on voice channels by transud-

ing during the first six months. Pan Am reported several failures in the NASA type DME and Boeing type DME which is currently starting testing.

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long many standard instructions from ground controllers is coded pulse data for read display as a console control interface. The pilot will then acknowledge receipt of these instructions back to the ground controller using a similar coded transmission.

In return for its troubles, AEEC hopes that the 520-A equipment can be used for either voice communications or for ATC88, thereby saving the airlines from buying special ATC88 transmitters and receivers.

► Special Requirements—Some of the more important requirements of the 520-A and ATC88 needs include:

- Rapid varying of transmitter to prevent

an RF envelope rise time of less than 1.5 microseconds;

- Greater bandwidth in modulator;
- Lower spurious radiation from transmitters;
- Reduced spurious response in receiver.

The 520-A type also provides for a narrow bandwidth and stability sufficient to permit its use in VHF network operations where several stations broadcast the same message at various wave frequencies as speeds 7.5 to 15.0 kHz.

The British are operating such networks under the name of "Chain" (Aviation Week June 23, 1952, p. 54).

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In the U.S., similar networks are in the process of development for specialized applications. One such network is operating as an evaluation base between Chicago and Cleveland, along United Air Lines routes, with five intermediate stations located at Chicago, South Bend and Akron (Ind.) and at Toledo and Cleveland.

New ILS Plan

The growing number of civil and military ILS installations, particularly a high density area, both in this country and in Europe, is making it necessary to put into use one of the frequencies originally set aside for ILS. This will create problems for those air lines which are still using the older (war surplus) ILS receivers which have provision for only six channels available in newer ILS equipment.

As a solution to the problem, the AEEC has proposed a plan which calls for:

- Discrete spacing of glide slope and localizer frequencies so that each glide slope frequency is assigned to one and only one localizer frequency;
- Frequency reassignment of some U.S. civil ILS so that all domestic stations will operate on one of six channels;
- Four additional ILS channels to be implemented for military and foreign use.

The AEEC based the results of a CAA study which showed that the only six existing civil ILS stations would require little or no shift under the proposed plan. These are Worcester, Mass., Hutchinson, Kan., Telephone and Atlantic City, N. J., Philadelphia, and New Castle, Del.

The AEEC endorsed the general features of the USAF plan, with the provision that any change in the existing discrete ILS frequencies prior to Jan. 1, 1959, is to be coordinated with the airlines affected by the change. Also January 1959, AEEC felt that all international civil ILS frequencies, other than those four channels, should be equipped to handle the additional channels where necessary.

The proposed plan has already been coordinated with the International Air Transport Assn. members and will come up for approval at the P-16 Communications Division meeting of the International Civil Aviation Organization next Spring.

How AEEC Works

The Aviation Electronic Engineering Committee is a 16-member group made up of representatives from 12 U.S. and Canadian airlines, plus one member from each of the following: Air Transport Assn., International Air Transport

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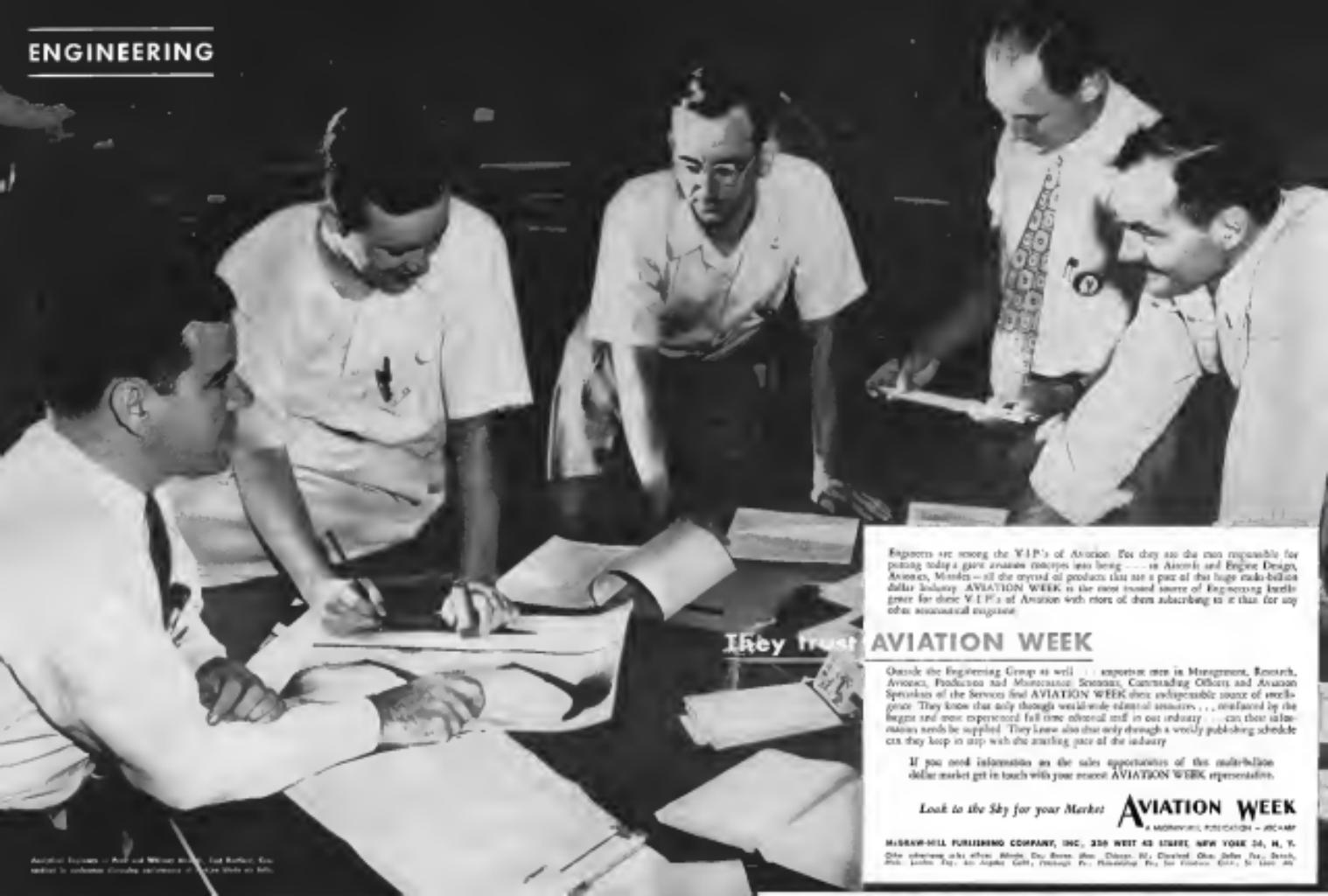
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a HARTZELL constant-speed propeller was Cessna's choice for their 180



A Hartzell constant-speed propeller is used and recommended on the Cessna 180.



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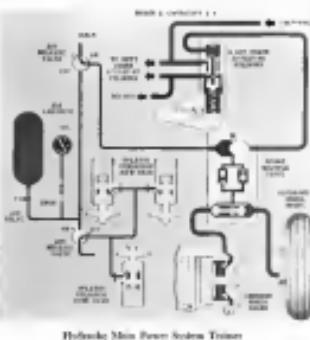


Laminated anchor bushing provides more construction time and cost reduction time in use tooling.

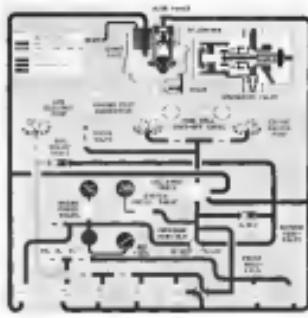


Curved anchor bushing for complex parts can be used in existing fixtures before tooling is required.

EQUIPMENT



Hydraulic Main Power System Diagram



Brake and Emergency Air System Diagram

Animated Panels Explain Convair 340

The job of teaching new purchases of the Convair 340 transport how the aircraft's various systems operate has been greatly simplified by the use of animated training panels.

Designed and produced by Technical Training Aids, Inc., the set of 16 panels depicts precisely each of the aircraft's major systems. Philips Avionics, KLM Royal Dutch Airlines and LAL (Latin American United Air Lines and Brazil International Airlines) have also used TIA's animated training panels for 747 restoration with considerable success.

According to TIA, the panels are

of training at Dallas, not one of the panels depicts the interior, info materials to give information which is at least 90% correct and to the point.

Following up mechanical training to maintain basic tasks are several animated panels, from the first to the most complex, designed for maintenance courses. Many more "Also teachable" training panels based on each aircraft's unique maintenance requirements of the aircraft, such as the one for the three systems using serval parts.

The animated aids panels make instruction as less time than is possible with the instruction of real parts. Costs can also be cut out. Time savings is largely due to the fact that as the various training aids, systems schematics and assembly drawings required for each system may be used to show their function most clearly than if the actual components were used.

► **Airline Life-B-Hire** is what makes possible for United Air Lines and Brazil how to do about the aids. ▶ **UAL** D. J. McDonald, technical training manager at the airline's main base at San Francisco, states: "In the opinion of our maintenance instructors, the training ... was definitely of great help in the conduct of the CV 340 training programs. The comments from the students who took the training program were about unanimous compliment.

► **RNP**: W. G. Maco, superintendent

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More than one of the trainers has greatly increased the versatility of flight deck maintenance instruction. And that is one of the main reasons of why to implement their training.

Braxell has found the initial cost of the panels is negligible when compared to savings realized through reduction in delays and downtime savings that is only from having well-informed, well-trained mechanics on the job.

When made up prior to delivery of new model aircraft, trainers have the added advantage of providing a pre-training course to give initial mechanical indoctrination before the sets the new plane.

The job was undertaken by American Airlines in preparing its mechanics for the CV 340.

The 16 panels delivered to Convair

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New Oil Additive Inhibits Engine Rust

A new, rust inhibiting oil additive, particularly selected for use in internal combustion, gas, diesel and gasoline engines, radiators, pipelines and furnace tools or components in the production stage, has recently been put on the market in commercial quantities by the Atlas Paint Co.

The firm says that the stabilizer, Aptol 100, "provides freedom from precipitation and other undesirable effects of oily residue encountered with ordinary stabilizers containing the salts of such metals as sodium, calcium or barium." Aptol 100 is a substance more than fifty and one-half times as effective as Atlas' Spars 50, used in many military applications. The maker points out, however, that the new stabilizer's "performance and economy" allow substantial improvement over Spars 50 under many conditions.

Shipping at a cost of \$1.00 for the 500-ounce canister, to add to 500 gal. the stabilizer has been put through extensive laboratory tests. These tests show that Aptol 100 provides improved protection even with use in reduced concentrations and that it gives consistently uniform action, Atlas says.

In a standard handily packed test, Aptol has withstood 634 hours' exposure at 1% concentration in oil, or nearly double that obtainable with earlier stabilizers, the maker claims. The new product also adheres well to highly refined oils which tend to resist the action of stabilizers.

Samples and literature are available from Industrial Chemical Dept., Atlas Powder Co., Wilmington 99, Del.

OFF THE LINE

Lockheed Atlantic Service-International, N. Y., has leased 10,400 sq. ft. of hangar and shop space from National Airlines at N. Y. International Airport (Idlewild). Additional hangar and open area totaling 221,000 sq. ft. and an employee park of 18,000 sq. ft. has also been leased by LASI at the facility.

Northwest Orient Airlines is reengining seven CB-2 models of the Pratt & Whitney Avcoats R4360 engine on its Boeing 707-320s to determine if this model of the engine with its increased cylinder life will (providing better cooling) and improved exhaust system design, giving greater engine power potential, should replace the B-7 version of the engine now being flown by NWA. Service tests will be completed in about six months. If successful, the CB-2 will replace the B-7 as an attraction.



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The Chicago Tribune

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Small Compressor for
Pneumatic Systems

Rhodes Lewis Co. announces production of a high pressure dc-driven air compressor which reportedly provides a complete, self-contained air source for pneumatic systems at 100 psi. This compressor is used in Lockheed, Martin and Grumman aircraft, the company says.

Affording space and weight reduction, the unit fits in a integral package, including all accessories and controls. It is described as a minimum in maintenance and upkeep—if one can be avoided or installed in aircraft an under five minutes.

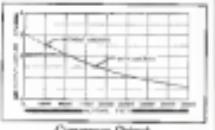
Manufacturers lists hydraulic model as an example of components of units. The compressor's capacity is 3 cfm at 1400 psi, but it weighs only 25 lb and complete package fits into area 10 in. in diameter by 13 in. high.

Swing in weight, weight and location and is claimed to show only constant low bearing load by use of opposing roller design. The design also has no bearing rods for the four pistons. Furthermore, a permitted through use of a single low friction gear, used between drive motor and compressor.

Rhodes Lewis states that piston length to stroke ratio is held to a minimum. Sessler ratio permits use of shorter length cylinders, does not cause excessive wear since favorable design creates piston length equal to length of entire valve assembly.

Metal to metal seals are used between piston and platen and cylinder head in all four stages. Brass discs are apparently fitted and valve rod guides are bushed metal in metal seals.

Manufacturers reveals that current production is limited to dc motor.



AVIATION WEEK, November 16, 1958

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with a.c. and hydraulic drives currently undergoing qualification tests.

Rhode Island Co. (subsidiary of McColloch Motors Corp.), Los Angeles, Calif.



Adjustable Positioning Bar Controls Press Movement

An adjustable control bar for positioning top and bottom of a press is featured in a new press position method developed by Dury Machine Specialties, Inc.

It is suspended by universally adjustable telescoping arms. With each change of position, the top of the bar can be recentered, with no readjusting necessary in position and time. Operative efficiency and safety are said to be greater. For changing dies, there is a strong overtravel limit of working area.

Motor movement of bar is made with three gearings, turned from hard steel, near control buttons. Height and position of barstock are quickly adjustable. Finger grips above can be used to prevent release of operator's arms during operation. Motorized switch is mounted by sufficient spacing of barstock to prevent unintended operation.

Dury Machine Specialties, Inc., 2100 South Laramie Ave., Chicago 30.

Efficiency Raised in New Explosion-Proof Motors

A new line of explosion-proof parallel shaft a.c. motors that offer better performance, greater efficiency and greater operation per hour is announced by Gencor Electric Co.

Designated Th. Class 56, the motors are 50% smaller and are 22% lighter per horsepower than previous models.

The new units incorporate a new insulation system, bearing assembly and ventilation plan.

One of the insulation systems is a new polyimide film, said to be eight times stronger than currently prevalent ones. Main insulation is an insulation of leaded mica, with the



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P-904 PRESSURE SWITCH

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An Aerotec P-904 Pressure Switch installed in the de-icing system of a Boeing Stratocruiser performed without any functional failure during thousands of flight hours. Upon removal, no drift in the pressure setting had occurred, and the unit was still in excellent condition.

Frequently used in the de-icing or cabin-heater systems of larger aircraft, the Aerotec P-904 Type Pressure Switches are also utilized to control ground heating blowers as well as flap, leading-edge and antiicing devices.

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ft. Now bearing system is better and is lubricated 5% greater and to last 50% times longer than any previous and Motor is uniformly cooled through double-entire ventilation system. Air is drawn in from beneath high exhausts, through bottom air passages and out low pressure side of the aircraft.

Longer, thicker cast rotor bars ins

crease cooling air flow through rotor and reduce rotor heat more effectively. GE engineers say that through new coil shield and frame design, protection has been increased by 60% on the drop proof enclosure.

Nose levels were a big consideration

in the engine design. GE say that

the nose level of the new 10-lb. engine

now sits as low as the former 2-lb. model.

Improved maintenance features, in addition to the single-lubricating gear, include permanently mounted main welding connection leads, larger diagnostic and control box, location of logs on one side, and location of insulation alongside connection dia

grams directly over box.

GE emphasizes that although size, weight and design have been drastically changed, the Tin-Clad 55 has high efficiency and will operate under greater load than usual conditions than the former design.

The engines will be available in 112 and 134 horsepower sizes (1, 14 and 2 hp at 1,000 rpm) in horizontal, dry-proof and totally enclosed free-ended models, and a complete line of gear motors. Larger frame sizes will be put out at regular intervals.

General Electric Co., Small Integral and Medium Industrial Motor Dept., Schenectady, N. Y. 12305



SELF-TIMING WELDER

Will now be furnished with the portable spot welder which has an auto-electronic timing control enclosed. It offers time cycle from 1/1000 sec. of a second to a full second, has output of over 15 kva. Power gap time is 1/100 sec. and has a built-in timer and relay of absorption and various forms of steel, including stainless. The spot welder dimensions up to 1/16 in. and weight 26 lb. Made by Anopcor Products Co., 1737 W 17th St., Oak Park, Ill.



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TWIN-ENGINE PIASECKI YH-36 helicopter would handle short-haul airline traffic, team up with freighter and long-haul transports.

Carriers Outline Helicopter Requirements

- Airlines want realistic safety, 30-place craft.
- Piasecki cites twin-rotor reliability, performance.

By Lee Masao

Practical airline requirements for a pressurized helicopter operation set realistic safety standards and a payload of 30 or more passengers, demonstrators before the American Helicopter Society's southeastern regional meeting avowed.

Lee Douglas, engineer, vice president of Piasecki Helicopter Corp., presented a detailed analysis of commercial cargo development trends and payload problems.

Cap. Bruce Moir, operational planning director of American Airlines, outlined local service requirements for a self-supporting cargo.

Engineering's Vice-Douglas' paper in detail that a twin-engine helicopter will be safe and economic if the true



LARGE CAPACITY of YH-36 is emphasized in view showing floor jacks stowed inside.

Turbines, Low Fares Spur BEA Business

A combination of recent fare and the introduction of turboprop-powered Viscounts on British European Airways Corp.'s most competitive routes have produced notable gains in passenger traffic.

• London-Geneva and London-Zurich—2,600 passengers in September 1955, compared with 3,116 in the same month a year ago.

• London-Stockholm—Copenhagen—3,407 passengers, against 1,863 flown in September 1952.



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SHORTLINES

► The airline still operates since Airspeed Ambassador Electebelch-chassis transports on Swiss routes.

ICAO Names Loneza Air Transport Chief

Dr. Enrique M. Loneza, Mexico's representative on the International Civil Aviation Organization's Council, has been appointed chairman of the Air Transport Committee.

The committee is a subsidiary body of the Council and deals with economic problems of international air transport.

► Air Transport Asia, has published its Organization and Development Asian Traffic Survey of Airline Passengers of September 1952. The four volumes 1, Summary of Domestic Traffic, 2 and 3, All Domestic Asian Passenger Traffic Between Territories, 4 International. Total cost \$15.

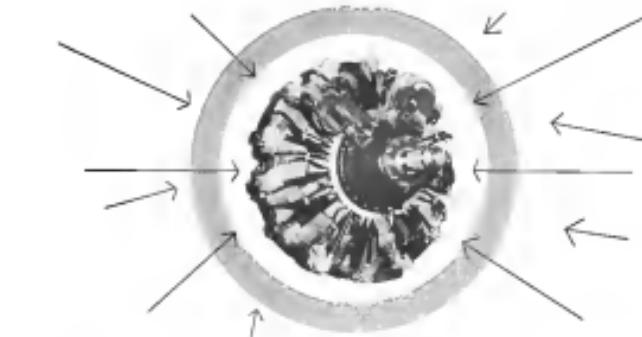
► California Air Service Co. has started an air taxi and ambulance service from Ontario Municipal Airport with two Hennings, a Shamus, Avro and Cessna.

► Civil Aviation Administration is experimenting with a new commercial pilot examination. It poses practical operation and navigation problems with reference to current available content of questions and answers that can be answered. CAA says it will decide only next year whether to adopt the new exam in the standard. CAA expects the number of aircraft for partaking in the new traffic control centers increased 13% from fiscal 1952 to 1955 with 12 of the 31 ATC centers having been built. 980,000 aircraft are in the air. Main airports: Atlanta, 25%; Jacksonville, 18%; and Los Angeles, 22%. CAA has issued the 1955 institutional handbook on civil aviation, the first published in two years. It covers passenger, air freight and other postal services, airports, federal airways, weather and terrain publications, general aviation, aeronautical publications and expenses and accidents. Cost is 40 cents from the Government Printing Office, Washington, D. C.

► Northwest Orient Airlines' newest winter schedule puts Stratojetts in Chicago-Twin Cities and Chicago-Bethleem flights.

► Trans World Airlines has bought 13 complete pressurization systems from Allis-Chalmers Manufacturing Co. for conversion of Lockheed Constellations to aircraft passenger density. TWA so far has bought 12 such pressurization systems for each conversion.

► United Air Lines plans to build a \$140,000 office and accounting building next to its executive headquarters in Chicago, has scheduled it for completion in July of next year.



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GOODYEAR AIRCRAFT CORPORATION, 1210 MASSILLON RD., AKRON 15, OHIO

AVIATION WEEK, November 16, 1953

Competition for the 'Fast Mail'

"Why give the airmen name and?" asks a headline in *Tours & Travel* magazine, over an article denouncing the current thousand serial trials.

"The public is getting faster service," is one answer. "Or do the hub dogs that's a virtue?"

Officials Break Security Too

Those of us in the press who face difficult decisions almost daily as to what to print and what to include in the best security interests of the country can sympathize with Air Force Secretary Talbott's apparent uncertainty in Madrid.

British and American press associations were, as well as special correspondents, told a news conference that the United States planned to store atomic weapons in Spain eventually. Later, Mr. Talbott denied he said it.

The most revealing statement of several that were released immediately afterward in Washington was that of Secretary of State Dallas—"If and when we have plans for storing atomic weapons, we shall not announce them publicly to the world and to our potential enemies."

We have a right to feel that the Secretaries for Air should know security.

But many men of Cabinet level, and high military officers, fumble on the subject from time to time, with the rest of us, and the mud shows they have committed security blunders that were whopping—some more serious than anything the press has ever connected.

The problem of what information can be disseminated safely will always be with us. Too often in the past, government people have tried to maintain the attitude that security blunders mainly were offenses by industry or press. We cannot, respectfully, that that is not by any means always the case. Madrid, for example?

"We Saw It Happen"

United Aircraft Corp. has produced a feature-length motion picture "depicting the name, the mass and the events in the fifty years of powered flight." Previous have been shown in New York, Washington, Hartford and Dallas, and the film is being edited for further exhibition.

Any such enterprise is difficult, and the problem here was confronted with acute problem of judgment in deciding what to include, cut and edit, and how to proportion the elements to convey the most authoritative, interesting and comprehensive story.

Despite these problems, and with the knowledge that no such exhibition product can please everyone, we feel that United Aircraft has performed a valuable service to aviation, especially in dispatching its cameras across all over the country to interview some of the oldest living persons in aeronautics.

—Robert H. Wood

These men, of high and low status in life, tell the stories of the parts they played in aviation history with an ease and enthusiasm that is seldom seen in the movies these days. These simple interviews of the old timers are not only absorbing stuff for those of us in aviation, they are a valuable and lasting contribution to aviation history.

Fewer Free Rides

An indignant reader takes AVIATION WEEK to task for recent publication of a letter from a Civil Aviation Administration agent. The letter, accompanied by a facsimile of a government transportation form completed by CAA agents above their tickets, which they sign themselves to obtain free transportation on the airlines, ostensibly to carry out their CAA duties. No check was ever made by CAA on the need for such travel, it was claimed.

The reader criticizes us for (1) Publishing an "unsigned" letter, (2) permitting such an accusation to be published, (3) not investigating the veracity of the writer's statements.

We have told the reader that (1) The writer signed his name to the letter last but we omitted it for his personal protection; (2) we know the writer, and his past reports had proved accurate; (3) the accusation was investigated and the agent's convictions were hence not by other CAA personnel.

We also told the critic that a few days after AVIATION WEEK appeared with the letter, a spokesman for CAA telephoned to thank us for publicizing the matter. He reported that all of the forms were being called in to regional offices where each ticket will be numbered before reuse. "Any numbered copy thrown away would be noted by the region and supervisor," CAA says.

Let's Outlaw Confusion

In an effort to ease public confusion, the Civil Aviation Board has ordered North American Airlines—wonderful to discontinue its name. It infringes on American Airlines' rights, the agency held.

For years—until recently—All-American Airways operated under that name, and there was confusion, but CAB never did anything about it—nor the "infringement."

We may await the fireworks that will let go when CAB starts similar action against Pan American. More confusion. More infringement.

And while the Board's easing public confusion, we wish they would see that Southwest Air Lines Railway changes its name immediately! The confusion on the one is terrible, and the ridiculous use of the words "air line" infringe on aviation.

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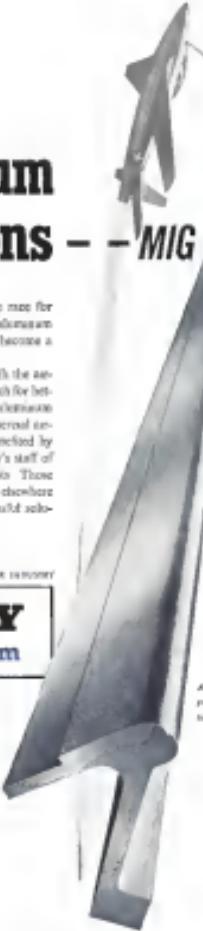
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TV-2 trainers. Through Allison engineering, these engines have established records for dependability and long-time operations as proved by an Air Force technical order permitting 1200 hours' operation between major overhauls.

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